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An Address

ON

THE EQUILIBRIUM OF CHEMICAL COMPOSITION IN LIVING CELLS*

By J. MAURICE JAVILLIER,

Professor at the Sorbonne,

Paris

YOU will not be surprised if I choose as subject for this lecture one of the questions which has occupied the best of my scientific activity for the last few years. It is, no doubt, a proof of the inability of our minds to look upon all the problems of even a single science with an equal keenness, a proof also of the sometimes exaggerated importance we are led to give to the facts we study personally, to the ideas we ardently and even passionately fight for.

I intend to make a rapid survey of the chemical composition of living beings, limiting myself to a few great groups of constituents of living substance and bringing out the notion of "the equilibrium of composition" in living matter.

Biological Chemistry has, as you know, two great aims: first, to determine the "chemical composition" of organisms, to isolate the "chemical compounds" out of these. By methods, every day more and more precise, one can determine in those chemical compounds the elements involved, the physical and chemical properties, and not only the constitution expressed by our plane-formulas, but also that expressed by our space-formulas. This very long and very elaborate investigation may be almost endlessly

developed, considering the tremendous number of animal, vegetable and microbic species.

The second aim of Biological Chemistry is to bring out the "reactions" taking place in the tissues, analytical or synthetic reactions, whose complex play represents, from the chemist's point of view, what is essential, characteristic even, in the extraordinary phenomenon which is life. The biochemist must not only ascertain that such or such reactions happen, but also try to penetrate the mechanism of each of these reactions and still more their physiological meaning. It is to those two aims that the two parts into which we are accustomed to divide biological chemistry correspond; the "static" part and the "dynamic" part. It is to the purely static part of biological chemistry that the considerations I mean to examine with you to-day belong. But the facts are so closely connected, and the classifications are, to such a great extent, the result of our mind's work, much more than the reflection of the nature of things, that we shall, from time to time, discreetly allude to the "dynamic" part.

The analysis of the organs of living beings shows us that, in spite of the infinite variety of the "native substances," in spite, for instance, of the diversity of the carbon compounds that the living cell can synthesize, all the substances which form the tissues of plants and animals, or at least the great majority of them, may be grouped in four great categories, established in

* An address given in the laboratory of Professor A. B. Macallum, McGill University, Montreal, April 3, 1928.

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a simple and logical way, perfectly justified from the chemical point of view as well as from the physiological one. Of these four great categories, three refer to organic principles: glucids, lipids, protids, as we are to call them now, according to the international agreement (instead of carbohydrates, fatty matters, lipoids and proteic substances); the fourth refers to mineral substances, that is to say, all the substances free from carbon, or holding carbon in the entirely oxydized form of carbonic anhydride or carbonate.

Indeed, when you study the varied tissues of living beings, so varied as regards their histological structure, their origin, their active or passive part, you discover that there are among them very considerable differences. Some are rich in glucids, and especially in certain glucids, insoluble in the usual reagents, resisting the biochemical actions, such as those that form the supporting apparatus of the plant. Others contain a considerable quantity of mineral insoluble matter, like the bony tissue of the vertebrate animals. Still others are remarkable for the abundance of lipids, which, in certain regions of the nervous system, for instance, represent even 80 per cent of the dry matter, and a still greater proportion in the adipose tissue, which is a tissue of protection and reserve. Others are richer in proteins, like certain glandular tissues of animals, or young seedlings of plants. Finally, still others are exceptionally rich in water; they constitute in that case real "liquid tissues," as blood, for instance.

In each of these tissues, together with the predominant substance, all other sorts of chemical compounds coexist. But, if we leave this superficial way of considering entirely different substances, and come to examine more closely and individually the various tissues, instead of an impression of diversity and infinite variety, we have a very intense impression of persistence in composition and stability in the chemical constitution of living matter. Let us now get acquainted with that impression by means of a few examples.

Among the constituents of the organisms, let us choose two groups: that of the *lipids* and that of the *protids*. As those two groups include extremely numerous and varied substances, we must be more precise as regards them.

For the lipids, we shall consider, as a whole,

all the bodies, chemically rather different, contained in the ethero-alcoholic extract of animal tissues. I say *animal* tissues, intentionally, so as to leave aside all that concerns plants, because we should otherwise risk wandering too far afield. We shall afterwards examine those things, which, in that intricate group of the lipids, are the most accessible to precise analytical determinations: *fatty acids*, *cholesterol*, *phosphorus*.

As regards proteids, we shall localize our attention on the *nucleo-proteids*, those fundamental phosphorus constituents of the cell nucleus, so remarkable for their chemical constitution and whose influence upon the growth, the division and the nutrition of cells, can never be over-estimated.

Let us then consider the total lipid content of the tissues. We find, first, that there is a certain quantity of lipids in all the tissues. None of them are entirely lacking in them. They are fundamental constituents of the cell. We then find (and it is the real object we are concerned with) that the proportion of lipids in a given tissue is of a certain constancy.

If we consider one single animal species, and in that species, individuals placed in as nearly identical physiological conditions as possible, we shall find numbers, not the same of course, but showing only slight oscillations about those averages. There is more to say. If we consider beings belonging to different species, not too far apart in the zoological classification, we find for their homologous organs, contents in total lipids which are not very different. A given histological type of cell element has a certain constancy in its content of total lipids. This constancy, of course, is far from being absolute. When experiment gives too widely divergent numbers, it proves that we must take into account, amongst other things, the notion of the physiological state; we ought also to distinguish in the general term of lipids, the real protoplasmic lipids from the reserve lipids. But, let us leave those details aside, though they are very important, and come to the more easily measurable constituents of those lipids. We already mentioned them: total fatty acids, cholesterol, lipidic phosphorus.

Let us thus make a series of quantitative measurements on those three categories of substances which are the most representative of the

group, and for which we now have very precise methods of estimation. Let us examine, with A. Mayer and G. Schaeffer, the analysis of various organs of animals belonging to different species: dog, rabbit, frog, pigeon, etc. This is what their experiments tell us.

CHOLESTEROL

1.—For one given species, the dog for instance, each organ has a definite amount of cholesterol.

2.—For the different organs, their contents in cholesterol are sufficiently distinct one from the other to constitute real chemical characteristics of these organs. For instance, the lung holds 2 grm. of cholesterol for 100 grm. of dry matter; the testicle 1.8; the kidney 1.2; the liver 0.7; the heart 0.4; the muscle 0.3. These figures are averages around which the real experimental figures group themselves. The individual divergences, though perceptible, are not very important. They are, at the utmost, 5 per cent for the lung, 6 per cent for the testicle, 10 per cent for the kidney. They may be more considerable and reach 20 per cent, and sometimes even more, for muscle.

3.—Among different species, the content in cholesterol for homologous organs is of the same order of magnitude. For instance, you find:

In the liver of the dog:

0.7 grm. of cholesterol for 100 grm. of dry matter.

In the liver of the rabbit:

0.8 grm. of cholesterol for 100 grm. of dry matter.

In the liver of the guinea-pig:

0.6 grm. of cholesterol for 100 grm. of dry matter.

In the liver of the toad:

0.8 grm. of cholesterol for 100 grm. of dry matter.

One finds also, it is true, figures that differ much from these. For instance:

In the liver of the pigeon:

1.2 grm. for 100 grm. of dry matter.

In the liver of the frog:

1.1 grm. for 100 grm. of dry matter.

In the liver of the adder:

1.2 grm. for 100 grm. of dry matter.

When these discrepancies in figures occur, they are like a characteristic of species; a similar discrepancy then occurs for the other organs, and thus the classification of the latter by their content in cholesterol remains the same in the different species. Accordingly, in the researches of the French physiologists, A. Mayer and G. Schaeffer, from whose work we

borrow these data, we find the following order generally observed: lung, kidney, liver, muscle, decreasing in richness of cholesterol. One is entitled to say that the content of a tissue in cholesterol is for that tissue a real "constant," provided that one does not give the word "constant" a meaning as strict as in mathematical language.

THE FATTY ACIDS

Let us now turn to the fatty acids. For these acids, experiment proves that there is no really characteristic amount for each organ; the content in fatty acids of the liver, the kidney, the lung, the pancreas, the muscle, the heart, may be of the same order of magnitude; one finds, for instance, for the dog, uniformly 11 per cent or about that in each of the above-mentioned organs. The content of the organs in fatty acids, on the contrary, varies in a large proportion, according to the species, and thus the average content in fatty acids for all of the tissues constitutes a real characteristic of species. Lastly, the physiological circumstances, such as the kind of food, the sexual activity, etc. . . . can have an appreciable influence. This is especially evident in birds, batrachians, and fishes, much more than among the mammals.

LIPIDIC PHOSPHORUS

We now come to "lipidic phosphorus," that is to say, that fraction of organic phosphorus one finds as lecithin, or a substance of similar constitution. Here is what the experiments of A. Mayer and G. Schaeffer, and our own, say about that question:

1.—The amount of lipidic phosphorus in the organs, expressed in percentage of the dry matter, is, for a given organ of a given species, almost constant.

2.—For a given species, the amounts of lipidic phosphorus are, in the various organs, very perceptibly different.

3.—For different species, the amount of lipidic phosphorus in homologous organs is of the same order of magnitude. Some organs are very rich in lipidic phosphorus; in the spinal marrow of mammals one estimates about 1.5 per cent, in the brain about 1 per cent, in the suprarenal and in the hypophysis up to 0.8 per cent.

Other organs are very poor in that form of phosphorus. The muscle is typical, having a content of about 0.2 per cent. The spleen and the thymus are also poor in lipidic phosphorus. Others still have contents of lipidic phosphorus ranging in an intermediate zone, between 0.4 and 0.6 per cent; such are the liver, the kidney, the pancreas, the lung, and the heart. These numbers are calculated for 100 parts of dry matter. But if one calculates the quantities of lipidic phosphorus for the fresh matter in its normal state of hydration, the content in lipidic phosphorus appears as a very characteristic amount in the organs. The organs we have grouped in the third category acquire more individual indices in lipidic phosphorus:—

0.10 for the lung.

0.13 for the kidney.

0.15 for the liver, etc. . . .

One might say that these indices could be used to define the tissues.

The facts I have just recalled in a very condensed summary were acquired about fifteen years ago, from a series of researches made by the two French physiologists I have already quoted, A. Mayer and G. Schaeffer. Some time later, I was able myself, with a few of my collaborators (Mlles. Groc, Rousseau, Crémieu, M. Allaire) to gather on the same subject, and in quite an incidental way, a fair number of experimental data which, on the whole, agree with those published by our predecessors.

We have recently analyzed, with Mlle. Crémieu, not isolated organs, but whole animals, chosen somewhat at random among the main divisions of the animal kingdom: a coelenterate like *Sagartia parasitica*, a worm of the class Chaetopoda like *Nereis versicolor*, etc. . . . a little fish like *Cyprin*, and a small mammal like the mouse. We found for their total content in lipidic phosphorus numbers hardly differing one from the other, and several about 200 mgm. per 100 gm. of dry matter. The differences between the extreme numbers were certainly not of the order of magnitude one might have expected from the complete diversity of the organisms that had been considered. This is a phenomenon which must be something more than a fact of pure chance, the proof of a certain similitude of composition of all the living matter in that respect.

Now, let us turn to what the analysis of organs shows us about the lipids upon the whole. Mayer and Schaeffer synthesized their thought and expressed the results of their experiments when they spoke of a "lipocytic constant" of tissues and of the existence of "lipocytic indices," among which the "cholesterol index" and the "lipidic phosphorus index" are the most evident. They went still farther. Calculating the ratios between quantities of fatty acids and cholesterol, they noticed that these quantities are for each sort of tissue in a precise constant ratio, and that these ratios vary with each tissue. They were thus enabled to speak of a "lipocytic coefficient" for tissues. For a dog, this ratio is 2.2 in the muscle; 6.8 in the liver; 10.5 in the kidney; 20 in the lung, etc. Thus, the idea that was the starting point of this lecture is justified in one respect. Let us now try to justify a second point. I have already told you we would choose therefor the study of the nucleic compounds.

NUCLEIC COMPOUNDS

Having succeeded in establishing, together with M. Allaire, a method, simple in its principle, minute in its application, for the quantitative determination of the fraction of phosphorus which is in the shape of nucleoproteids, or nucleic phosphorus, as we say for short, we wondered whether there was for each tissue of each living species a content in nucleic phosphorus characteristic of each of them, and of a constancy sufficient to constitute a true index. We wondered whether there was an "index of nucleic phosphorus", as there is one of cholesterol and of lipidic phosphorus.

It is hardly necessary to emphasize the importance we were entitled to give to such an index. That nucleic phosphorus is the phosphorus of the essential constituents of the nucleus of the cell. Its value may represent a mode of expression of the nuclear mass, a mass for which numerical expressions are entirely lacking, or are liable to serious objections. This is what we found: for a stated animal, the values of nucleic phosphorus are extremely different for the various organs.

Here are the values we established for the organs of a horse (18 months):—

Organs	Nucleic P. in mgm. per 100 gm.	
	Fresh matter	Dry matter
Thymus	249	1296
Pancreas	141.5	643
Spleen	92.3	390
Suprarenal	63.7	253
Liver	55.6	204
Testicle	47.8	356
Lung	37.2	204
Thyroid	36.9	139
Kidney	33.6	169
Heart	12.8	61
Brain	12.3	75
Muscle	6.1	25
Spinal marrow	6.1	20

The differences between these organs, from the point of view of their content in nucleic phosphorus, are of an order of magnitude such that the numbers which express the rate of nucleic phosphorus constitute real characteristics of these organs; indeed they are real indices. But, to be entitled to speak of indices, the same numbers must be found with sufficient regularity among the various individuals of each species. This is precisely what our experiments verify. Nevertheless, certain differences in the physiological state must not interfere. In that respect, I should like to give two typical examples; one of variation, the other, on the contrary, of stability, for the value of the indices of nucleic phosphorus.

First, the example of variation:

I shall take it in what happens at the beginning of life. A mammal that is just born has a certain total content of nucleic phosphorus; then, as it gradually grows, this content gets smaller and smaller, remains low for a time, then rises again, and rests after a while at a level which remains the normal one for a long time. It is, we may notice, exactly the reverse of the change observed with respect to lipidic phosphorus. Thus at the beginning of life, there are variations of a certain amplitude. We observed them very closely in the rat, with M. Allaire and Mlle. Rousseau.

And now the example of stability:

I shall take it in the researches, undertaken with the same collaborators, on the influence of deficiency of a vitamin, the lipo-soluble vitamin A, upon the chemical composition of animals. While a theoretical idea, which it is not the time to develop here, led us to suppose that this deficiency might cause a sensible fall of the nucleic phosphorus, experiment proved to us that it does not bring the loss of equilibrium of the organism in its content in nucleic

phosphorus. If there is a small diminution because of that deficiency, that diminution is unimportant (in the case of a mouse), and experiments made upon rats, which will soon be published, reduce to nothing the idea that there may be such a diminution. This is, I must say, one of the finest examples I have ever seen of the constancy of composition of living matter in thoroughly different physiological states, since one of them is accompanied with serious health disturbances followed by rapid death, while the other favours a normal growth and evolution.

The amounts of nucleic phosphorus characterize not only the various organs of a stated species; with different species one finds for homologous organs, numbers which are not the same, of course, but which oscillate between very narrow limits. We have analyzed, in recent years, the organs of a fair number of animals. The impression left by careful study is that each organ is characterized by a certain content in nucleic phosphorus. The spleen is rich in nucleic phosphorus, with an index of 300 to 400 (that is to say 300 to 400 mgm. of nucleic phosphorus for 100 gm. of dry spleen); the liver is not so rich, with an index of about 200; the kidney comes next, with an index of about 150; the brain is poor, with an index of about 70; the heart also, with an index of 55, and the muscle still poorer, with an index of 30. Of course, I am simplifying the facts and am not giving you the details of variations around these average numbers, variations whose causes can be discerned in many a circumstance.

Yet, this is not all. If the study of the quantitative ratios between the constituents of the cellular lipids gives us interesting views on the question, in the same way that of the quantitative ratios between the various phosphorus compounds of cells brings us to some remarks capable of strengthening the notion of cellular chemical equilibria.

In the course of the researches made during the last few years, we have determined the quantitative ratios existing between the different forms of phosphorus and the total phosphorus, and between the different forms of phosphorus themselves, in the organs of various animal species under various physiological circumstances. The ratios offering the greatest interest are the following:—

lipidic P.
total P.

nucleic P.
total P.

nucleic P.
lipidic P.

The first indicates the portion of total phosphorus in the cell, which is included in those essential cytoplasmic constituents that are the phospholipids; the second indicates the portion of total phosphorus included in the constituents of the nucleus of the cell; the third ratio concerns the values of phosphorus comprised in the two forms, which are the most highly differentiated from the immediate phosphorus compounds: cytoplasmic phospholipids, karyoplasmic proteids.

Here, for example, are a few of the numerical data we have gathered. The ratios $\frac{\text{Lipidic P.}}{\text{Total P.}}$ $\frac{\text{Nucleic P.}}{\text{Total P.}}$ $\frac{\text{Nucleic P.}}{\text{Lipidic P.}}$ are relative to a horse in good health, killed as the result of an accident.

Organs	$\frac{\text{Lipidic P.}}{\text{Total P.}} \times 100$	$\frac{\text{Nucleic P.}}{\text{Total P.}} \times 100$	$\frac{\text{Nucleic P.}}{\text{Lipidic P.}} \times 100$
Thymus	18.87	58.45	309.7
Pancreas	40.51	36.70	90.5
Spleen	32.18	35.10	109.1
Suprarenal ..	63.80	20.27	31.7
Liver	50.76	19.35	38.1
Testicle	43.70	23.60	54
Lung	52.33	19.31	36.9
Thyroid	34.05	31.81	93.4
Kidney	46.45	15.18	32.6
Heart	50.	6.08	12.1
Brain	79.39	4.80	6.
Muscle	31.71	2.82	8.8
Spinal marrow.	90.36	1.09	1.2

So you can see the proportions of lipidic phosphorus ranging between 18 and 90 per cent of the total phosphorus; that of the nucleic phosphorus between 1 and 58 per cent; and finally the ratio $\frac{\text{nucleic P.}}{\text{lipidic P.}} \times 100$ rising from the value 1 (spinal marrow) to 309 (thymus).

As other experiments prove, the values of those ratios are sufficiently stable, when you pass from one individual to another of the same species, to constitute new indices and new constants. Of course, one must not go too far, and we might find some physiological circumstances that would disturb them. As regards the deficiency in vitamin A, no such things happen. For a mouse, we found, for the whole of its soft tissues, a ratio $\frac{\text{nucleic P.}}{\text{total P.}}$ equal to 17 for the vitamin deficient animals, as well as for the normal ones; a ratio $\frac{\text{nucleic P.}}{\text{lipidic P.}}$ equal to 36 for the vitamin deficient animals and 37.7 for the normal ones, that is to say very close numbers.

Age seems to be of more importance; yet even it seems to interfere noticeably only at the beginning of life, during the lactation

period for the mammals, when normal ratios are not established.

For some organs of certain species, the state of sexual activity comes in to modify the state of equilibrium, but on that point we have not yet a sufficient number of precise experimental data.

The examples I have just given to you of the lipidic constituents of tissues, and of their nucleic constituents, have brought to you, I suppose, the conviction that there is normally in the living matter a certain equilibrium between its constituents, and that, for each tissue, there are among its materials of construction, certain relations of quantity which are permanent ratios, physiological ratios.

The chemical specificity of the tissues results not only from the constitution of their proteids and lipids, from the elective fixation of such and such mineral element, etc., but also from a certain equilibrium, and from a permanent harmony of composition, characteristic of each of them. These considerations would easily suggest others which would carry us into the field of pathology. But I will not impose on your kind attention and I am only going to draw a single conclusion from what we have seen.

If the various organs of a living being have a chemical composition characterized by a definite relatively stable equilibrium between its various constituents, the total being must have itself a certain harmony of composition. This may be more or less specific, sometimes perhaps hidden in exceptional conditions, but it is always inclined to return to this equilibrium. Could we not conclude, then, that for each species there must be a diet, more strictly suitable than any other, which in its own equilibrium of composition must be like the faithful echo of that of the beings for which it is destined. In other words, does not the notion of physiological equilibriums imply, as a necessary corollary, that of alimentary equilibriums. To that question, one might answer "yes", *a priori*. But one can also answer after making experiments to that effect. The necessity of a certain equilibrium in the composition of food material appeared a long time ago in the experiments of synthetical alimentation of plants, as it also appeared, but more grossly, in agricultural practice.

To speak only of what I personally have

observed, let me remind you that in our studies upon catalytic elements—manganese and zinc—in the cultivation of *Aspergillus Niger* we clearly distinguished, M. G. Bertrand and I, that interdependence of the constituents of the nutritive medium. It is not enough to give the plant all that it requires; the elements of the medium must also be present in appropriate quantitative ratios. I do not mean to say that the plant will not live if these ratios are not respected (they are not observed in nature), but that the optimum growth of plants, and the most economical utilization of food, will correspond to given ratios between all the elements, the plastic as well as the catalytic. For zinc, I have clearly stated that it interferes, directly or indirectly, in the utilization of sugar.

That idea of the necessity of an alimentary equilibrium for animals and man (who is indeed the animal that feeds himself in the least rational manner) has also occurred to our mind in a rather confused and indefinite way. The reason is that the problem is here more complicated and experiment more difficult. Still, the thought is becoming gradually more

precise. The zootechnicians are well aware that there is a certain optimum ratio between the proteic food and the non-proteic food, between the intake of phosphorus and that of calcium. Mme. Randoin and M. Simonnet have recently given a remarkable instance of the necessity of such an equilibrium. Having found that the vitamin B, is, among other things, the factor for utilization of sugar, they stated that a certain quantitative ratio between factor B and the glucide of the diet must exist. Equilibrium of cellular composition, equilibrium of composition of the food, and, between the two, if I may say so, equilibrium of composition of the interior medium, here are the three necessities, answering and co-ordinating one another.

It seems to me that a notion like this is worth calling to the attention of biochemists and physiologists, and it is because I am deeply imbued with that thought, that I have allowed myself to go so far in speaking to you about it.

This has been for me an opportunity to appreciate, together with the cordiality of your welcome, the kind attention you have favoured me with. Let me thank you heartily for it.

THE ASSESSMENT OF CARDIAC MURMURS

BY JAMES ORR, M.B., M.R.C.P. (EDIN.),

*Physician, James Mackenzie Institute for Clinical Research,
St. Andrews, Scotland*

THE significance of a cardiac murmur is essentially diagnostic. From the point of view of prognosis, the murmur *per se* is of little value. In every cardiac condition, in which a murmur is present, prognosis depends upon the recognition and proper appraisal of such symptoms as indicate the degree of efficiency of the ventricular muscle. To elicit this information the patient must be regarded as a whole. It is impossible to base a correct prognosis on the presence or absence of any one sign or symptom. Further, the symptoms upon which diagnosis is based are not necessarily those upon which prognosis is assessed, and, in the course of clinical examination, it is desirable to separate clearly these two groups of symptoms.

Diagnosis is, in the main, based upon the recognition of the structural change to which an

organ has been subjected. Prognosis, on the other hand, involves an appreciation of the extent to which the functional efficiency of the organ has been impaired. Diagnosis depends largely upon the presence or absence of certain physical signs; prognosis, upon the subjective symptoms of which the patient makes complaint. Physical findings are referable directly to the organ involved, whereas the symptoms of functional embarrassment are, in the earlier stages at least, manifested by organs other than that which is the seat of the pathological change. Thus diagnosis, however correct it may be, does not carry its prognosis with it. Mass-prognosis is easily arrived at on the basis of pathological diagnosis. It is possible from actuarial figures to arrive at an exact estimate of the mortality and morbidity incidence of any given condition,

but physical signs give little help in framing the individual prognosis which the patient seeks. This can only be obtained by a careful estimate of the functional efficiency of the organ concerned. In the case of the heart this resolves itself into an estimation of the efficiency of the ventricular muscle, and many means have been devised to this end. Some of these are based upon the reaction of the heart, or of the blood pressure to muscular exertion; others upon certain abnormalities demonstrable in the electrocardiogram. None of these are altogether reliable, and their findings are frequently belied by the subsequent history of the patient. The only test upon which reliance can be placed is the clinical test of the response of the patient to ordinary muscular exertion, *i.e.*, the manner in which he is able to perform his usual daily activities as indicated by the symptoms and sensations to which their performance gives rise. A patient whose myocardium is becoming impaired will recognize a limitation of a definite kind in his capacity for effort long before examination will reveal anything amiss. This method has the further advantage that it is individual, the patient being compared with his own previous normal. The so-called "exercise tolerance" tests have the disadvantage that they lack the essential factor of control. The patient is tested against a standard to which his relation in the days of his normal health is unknown. No reaction which a patient shows in response to muscular exertion can ever be regarded as unimportant, but the real question is, how the reaction at the time of examination compares with a similar reaction in health. In the case of the clinical test, the patient can supply this information with great accuracy.

Much ingenuity has been exercised in the classification of murmurs, especially systolic murmurs, and various conclusions have been based upon these classifications. Thus, systolic murmurs have been divided into those which follow the first sound, those which replace it, and those which occur concurrently with it. Again, they have been classified as blowing, rough or musical, according to their quality. Whatever descriptive or diagnostic value such classification may possess, it is entirely inadequate as a means of prognostic assessment. The only factor which is of any importance for this purpose is the capacity of the ventricular

muscle to maintain an adequate circulation. No consistent relation between this capacity and any of the variations which the murmur may show has ever been demonstrated.

Mackenzie classified cardiac murmurs into three groups—the physiological, the functional, and the organic. This classification was introduced as a reaction against the then current view that all murmurs were necessarily of serious import.

The physiological murmur occurs in conditions of perfect health, in which the heart responds normally to every demand made upon it. If from accident or other cause death occurs, the heart shows no abnormality on post mortem examination. Postural systolic murmurs and respiratory murmurs belong to this group.

Functional murmurs are not associated with any organic change in the valve. They usually occur in association with a degree of dilatation of the heart, and are presumably due to relaxation of the mitral ring. They are accompanied with some limitation of the response to effort. Physiological and functional murmurs are always systolic in time. Functional diastolic murmurs have been described, but their occurrence is so rare as to be negligible.

Organic murmurs are associated with secondary changes in the valve, generally of a fibrotic or degenerative kind. The distinction between a functional and an organic murmur is not always possible. In doubtful cases, the history is of the highest importance. A rough or musical quality is perhaps more common in organic murmurs. The importance of an organic murmur is that it indicates that the valve is, or has been, the seat of disease, and raises the question as to whether other and more vital parts of the heart may not have been invaded also. To assess the value of any murmur, it must be considered from two points of view, *viz.*, the condition of the orifice, and the condition of the myocardium.

APPLICATION

Diastolic Murmurs.—Diastolic murmurs are nearly always organic in origin, and indicate lesions of valves which embarrass the heart and tend to the production of heart failure. A murmur occurring during diastole means that one of two conditions is present, either mitral stenosis or aortic regurgitation.

Murmurs of mitral stenosis. The earliest

sign of mitral stenosis is the occurrence of a short murmur immediately preceding the first sound. At first this murmur is variable, but soon becomes persistent. Occasionally, the first indication of the condition is to be found in a reduplication of the second sound. As the stenosis advances a short diastolic murmur is added, which gradually increases in length as the contraction of the valve orifice proceeds, until it occupies the whole of the diastolic pause. Should fibrillation of the auricle supervene, the presystolic element of the murmur disappears, leaving only the diastolic murmur. In cases where the onset of the presystolic murmur has been observed a fair idea of the progress of the condition can be obtained by observing the rate at which these changes occur. If the case is seen at a later stage, a history can often be obtained of an attack of rheumatic fever which presumably set up the valve mischief, and the rate of progress assessed in a similar manner. The stenosis being due to cicatricial contraction, the presystolic murmur is never heard during the initial illness, but follows it after a considerable interval of time. Exact evidence of the rate at which the murmurs of mitral stenosis develop is scanty, but from a small series of cases in which this condition has been observed to follow rheumatic fever, a period of two to five years elapsed between the attack and the appearance of the presystolic murmur.

In one case of rheumatic endocarditis, in which the heart was examined at four day intervals over a period of nearly two years, the first appearance of the murmur of endocarditis was noted on the ninth day of the illness (January 12, 1922). An aortic regurgitant murmur was noted on February 7, 1923. A reduplication of the second sound at the apex suggestive of mitral stenosis appeared July 27, 1923. Death occurred from erysipelas and septic pneumonia November 1, 1923, no presystolic murmur having developed up to that time. Post mortem examination showed the typical appearance of old-standing endocarditis, narrowing of the mitral orifice, the cusps of the valve being thickened, fibrous, shrunken, and fused with one another at the adjacent margins. The aortic valve was incompetent, the cusps being thickened at their margins and slightly shrivelled.

The presence of a presystolic murmur is in itself a useful starting point for assessing the progress of the condition. Thus, mitral stenosis in young people, accompanied by presystolic and diastolic murmurs, is a very grave condition; whereas in a middle-aged patient, with a history of rheumatic fever in childhood, and only a presystolic murmur present, the rate of stenosis is obviously slow and may even be stationary. In cases which are progressive there are invariably factors present other than the valve change. Rheumatic infection affects all the tissues of the heart and usually produces a degree of impairment of the ventricular muscle. It is upon this factor that the prognosis in the main depends. Evidence of affection of the conducting system—or genetic system, as Mackenzie more correctly called it,—is to be found in the presence of the mid-diastolic murmur. This murmur is separated from both the first and second sounds. Mackenzie demonstrated that it coincided in time with the auricular systole, its occurrence in mid-diastole being due to the fact that the systole of the auricle was separated by a pause from that of the ventricle. The presence of a mid-diastolic murmur, therefore, is evidence not only of the presence of mitral stenosis, but also of a degree of heart-block. There are thus three factors of importance in the assessment of the murmurs of mitral stenosis: (1) the nature of the murmur present, as indicating the condition of the orifice; (2) the rapidity with which the sequence of murmurs is developing; and (3) the capacity of the heart muscle to carry on an efficient circulation, in spite of the obstruction caused by the valvular defect. If fibrillation has occurred, an additional embarrassment is thrown on the ventricular muscle, and in these conditions the prognosis must be based on the third factor, and upon a consideration of the response to treatment. Patients with mitral lesions rarely die in their first attack of heart-failure, however severe it may be, and no adequate prognosis in such cases is possible until the response to treatment has been carefully observed. A considerable proportion of the subjects of mitral stenosis do not die from heart-failure at all—according to Cabot about one-half—but from some intercurrent affection, or from malignant endocarditis.

Murmurs of aortic regurgitation. Aortic regurgitation is, as a rule, a very serious condition, though this is not invariably the case. Many elderly people showing the characteristic murmurs of aortic regurgitation lead healthy and even strenuous lives, while others showing identical murmurs pass rapidly into a condition of extreme heart-failure. No valid prognosis can thus be based upon the mere presence of a regurgitant murmur. Nor does the amount of regurgitation appear to be a factor of any particular significance. Even if it were, the possibility of gauging the extent of the regurgitation clinically is an exceedingly doubtful one. The loudness of the diastolic murmur, its length, the presence or absence of the second sound, have been suggested as possible indications of the extent of the regurgitation. The difference between the systolic and diastolic arterial pressure, *i.e.*, the pulse pressure, has been utilized for the same purpose. The main difficulty with such indications is that they are not always consistent in the same patient. Thus, a long diastolic murmur, suggestive of a large leak, may be associated with a moderate pulse-pressure. Apart from the fact that there is no reliable method by which the amount of regurgitation can be estimated clinically, post-mortem evidence gives no support to the view that the extent of the damage to the valve necessarily corresponds with the degree of heart-failure observed during life.

The condition of the pulse, though of little help as an index of the degree of regurgitation, is, nevertheless, a factor of considerable prognostic importance. As a rule, when the systolic pressure is very high and the diastolic pressure very low (190-60), other evidence of heart-failure is present. A moderate difference between the systolic and diastolic pressures (180-90) is quite consistent with an efficient heart, while, in some cases, the difference is equal to the normal. In these last instances the pulse has little of a collapsing character, though, as Vaquez points out, the abrupt rise of pressure with each pulse beat is apt to convey to the finger an impression of a collapsing quality. When aortic regurgitation is arterial in origin, the diastolic pressure may be consistently high. The pulse condition, therefore, must be considered in conjunction with

the other symptoms present. Among these other symptoms the size of the heart is an important guide. In the cases who lead vigorous lives, free from any suggestion of heart failure, the left ventricle is never more than slightly hypertrophied, the murmurs being dependent upon changes which are, in the main, limited to the valves. In more serious conditions, all degrees of hypertrophy may be present.

The most important prognostic factor in this, as in all other cardiac conditions, is the state of the ventricular muscle, as shown by the response of the patient to ordinary effort. Contrary to what obtains in mitral disease, the heart failure of aortic regurgitation is less susceptible to treatment, and recovery is less frequent and less pronounced than in heart failure resulting from any other condition. Even when heart failure is extreme in mitral stenosis with auricular fibrillation, a good recovery may often occur, but in aortic disease with auricular fibrillation the heart failure is usually steadily progressive, and it is seldom possible to check its progress.

Systolic Murmurs.—The assessment of systolic murmurs is conducted on entirely the same principle as has been indicated in dealing with diastolic murmurs. Systolic murmurs, however, present certain difficulties of their own, owing largely to the frequency with which they are functional or physiological in origin. In the case of a systolic murmur arising in the course of an acute affection, the distinction between a functional and organic murmur may be very difficult, and, particularly in the case of rheumatic fever, the gravest issues may depend upon its proper interpretation.

Aortic stenosis. In the case of a systolic murmur discovered on ordinary examination, the important point to define is whether or not it is associated with signs indicating that the ventricle is being hampered in its work. The murmur of aortic stenosis is a case in point. A systolic murmur at the base of the heart is in the majority of instances functional or physiological in origin, and is not associated with any evidence of inefficiency of the ventricular muscle. If the aortic orifice is narrowed, the response to effort will be limited and the left ventricle enlarged. A pulse tracing may show the anacrotic pulse sometimes associated with this condition.

Aortic stenosis occurring by itself is an exceedingly rare condition.

Mitral incompetence. Mitral incompetence by itself probably never constitutes a serious embarrassment to the heart. The recent work of Cabot would appear to indicate that mitral regurgitation is the rarest of all valvular affections, and indeed may be said hardly to exist at all as a pathological entity. How far it exists as a clinical entity is perhaps another proposition, for there does not seem to be any certain means of estimating after death what the competence of the valve may have been during life. While pathological evidence of organic mitral insufficiency may be scanty, functional mitral regurgitation due to relaxation of the mitral ring may be of more frequent occurrence. The question is, however, of little practical importance, for in estimating the significance of systolic murmurs at the mitral valve it makes little difference whether or not regurgitation is present, provided that the heart muscle shows no signs of inefficiency.

A systolic murmur discovered accidentally in an individual who is otherwise in perfect health, and who shows no limitation in his capacity for effort, may be completely disregarded. If it occurs in association with signs indicating a limitation of response to muscular effort, especially if the limitation be that of breathlessness or pain in the chest, the prognosis should be based upon these signs, and not on the murmur, the presence or absence of which does not affect the issue to any degree.

Systolic murmurs arising in the course of acute illness. In the course of acute illness a systolic murmur is prone to develop, especially in young subjects, and is frequently associated with a degree of dilatation of the heart. The murmur in the majority of these cases is functional in origin, and usually disappears when convalescence is established. A functional murmur arising in such circumstances is unaccompanied by any signs of deterioration in the patient's general condition. The course of the illness is unaffected, the rate of the pulse remains unaltered, and the patient progresses normally towards convalescence. Coombs lays stress on the fact that the inorganic murmur is audible in all areas and that the heart is not as a rule enlarged. If a murmur is caused by a lesion which embarrasses the heart in its

work, the chamber affected will alter in form, either by dilating or by becoming hypertrophied. The absence, then, of any alteration in the size of the heart is evidence that there is little embarrassment. The presence of the general characteristics of inorganic murmurs, such as postural variation, etc., are important confirmatory signs. The distinction between functional and endocardial murmurs is often impossible during the acute phase of an illness. It is necessary as a rule to suspend judgment until the subsidence of the acute attack, when the points of distinction become more evident. This is particularly so in the case of rheumatic fever. In this condition, as in other acute affections, a functional systolic murmur is frequently present. On the other hand, the liability of the heart to rheumatic infection suggests a possible endocardial origin for any murmur which may develop. It is obviously of the highest importance that these two conditions should be clearly differentiated. There is no one criterion which is applicable to all cases. Each must be judged on its own merits, but there are certain general considerations which help towards a correct decision.

The mode of onset of the murmur, and the conditions associated with its development, provide the most reliable indications for this purpose. The murmur of endocarditis usually begins with a blurring of the first sound in the mitral area, and is associated with persistent rapidity of the pulse and a decline, or at least a want of improvement, in the condition of the patient. The blurred first sound soon gives place to a definite murmur and is associated, as a rule, with perceptible dilatation of the heart. Dilatation of the heart may occur in conjunction with a murmur which is purely functional, but these two signs, plus persistent rapidity of the pulse and want of improvement in the general condition, are highly suggestive of the onset of endocarditis. Should rheumatic nodules be present, the diagnosis is practically certain. Endocarditis, which is more prone to occur in young subjects, generally makes its appearance during the first fortnight of rheumatic fever. The murmur itself may not appear for a considerable time, and the heart should be carefully watched for its occurrence until well after the joint symptoms have subsided.

AORTIC INSUFFICIENCY DUE TO RUPTURE BY STRAIN OF A NORMAL AORTIC VALVE*

BY C. P. HOWARD, B.A., M.D., C.M.,

Montreal

IN a hospital experience of twenty-five years I had never seen a case of aortic insufficiency due to rupture of an aortic valve and, therefore, considered the following case report worth recording.

After a brief outline of the case, I shall discuss the incidence of this comparatively rare accident, classify the cases, and then discuss at some length the pathogenesis, pathology and symptomatology of the group.

CASE REPORT

H. B., aet. 33; chauffeur; admitted to the Montreal General Hospital on November 6, 1924, complaining of pain over the heart, palpitation, shortness of breath, cough and swelling of the feet.

Family History.—Negative, except that the father died at 53 from "heart disease."

Personal History.—The patient denied rheumatic fever, chorea and syphilis. He had been married one year; his wife had had one full term child and no miscarriages. He smoked to excess and used alcohol moderately. He had enjoyed perfect health previously.

Present Illness began on October 6, 1924, when one cold morning, after cranking his car for two minutes, he was suddenly seized with a sharp pain in the left upper chest and especially in the epigastrium, but with no radiation to the arm; he immediately became short of breath and began to cough. He remained at work for some hours, when he stopped on account of the pain in the epigastrium and dyspnoea. Subsequently he noted a "thrill" in the left upper chest. He remained in bed two weeks and then returned to work, but was forced to give up again on November 1, 1924, as his symptoms had become very acute. The pain then radiated down the left arm and even to the left leg. He became very orthopnoic and vomited constantly. Edema of the feet also appeared.

Physical examination revealed a large, stout, French-Canadian male, in great respiratory distress. The colour of the face was sallow, but cyanosis of the lips, ears and finger tips was present. The thorax was very large. There was impairment of the note at both bases with suppression of the breath sounds and the presence of many moist râles. Heart: There was slight bulging of the precordium and a widespread heaving impulse visible over the entire left chest, the point of maximum intensity of which was in the fifth interspace, 12 cm. from the midsternum. On palpation over the left base, a very intense vibratory thrill could be felt, perceptible throughout the entire cardiac cycle, but with definite systolic and diastolic intensification. The relative cardiac dullness began in the second interspace and was much increased to the right (5 cm.), but more particularly to the left (15 cm.) of the midsternal line. On auscultation, the heart sounds were replaced by murmurs, whose maximum intensity

was at the third and fourth left interspaces close to the sternum. The systolic murmur was rough and vibratory and filled the entire systolic period, completely obliterating the first sound; though very widely distributed it was of maximum intensity in the second right interspace. The diastolic murmur was of higher pitch, shorter and more musical, and, though propagated to the apex and into the vessels of the neck, was of maximum intensity over the third left interspace close to the sternum. No second sound could be heard. The pulse was of the typical water-hammer character, and was rapid, with a palpable vibratory thrill. The sphygmomanometer revealed a systolic blood pressure of 130 mm., and a diastolic that varied from 40 to zero. There was a marked pulsation of the carotid, brachial and femoral arteries, as well as a definite capillary pulse. The electrocardiogram showed an inversion of the "T-wave" in all leads. Fluoroscopic examination revealed an enormous heart with no aneurysm. The liver was enlarged and tender. While there was no ascites there was edema of the legs. In the urine there was a constant albuminuria, but no cylindruria. The blood count was normal; (75 per cent haemoglobin; red blood cells 5,080,000), except for an occasional leucocytosis, (7,500 to 11,000). Two blood Wassermann tests were negative.

The diagnosis favoured was, either a congenital heart lesion with cardiac decompensation, or an acquired aortic insufficiency with the sudden onset of cardiac decompensation due to strain, though the possibility of a rupture of an aortic cusp was suggested by my resident physician, Dr. E. S. Mills, and was seriously considered.

The course was practically a downhill one, in spite of short periods of apparent improvement from the bed rest and digitalis. However, the cardiac distress, dyspnoea and edema increased, and there developed, first, signs of infarction of both lungs, and finally a thrombosis of the posterior tibial vein. Death occurred on January 1st, from progressive cardiac decompensation, practically twelve weeks after the severe muscular effort.

Post-mortem.—There were, in addition to marked edema of the lower extremities, dense adhesions about the right lung, with an old tuberculous cavity in the right apex and a scar of the left apex; recent infarcts in the right lower as well as in the left upper and left lower lobes; acute fibrinous pleurisy over the infarcted areas. The common attachment of the anterior and medial (left posterior) cusps of the aortic valve was torn away from the aortic wall, due to a transverse tear in the intima, five-eighths of an inch in length, allowing the cusps to become very lax, (see photographs). The mitral valve showed slight thickening. There was a fairly extensive sclerosis in the sinus of Valsalva, and a still earlier process in the root and arch of the aorta as well as the descending aorta. The heart weighed 640 gm., and showed marked hypertrophy with dilatation of the left ventricle and great dilatation of the right. The liver, spleen and kidneys revealed marked passive congestion. Microscopically, the aortic cusp was normal. The vasa vasorum of the aorta showed no evidence of syphilis.

* Read before the Association of American Physicians, May 6, 1925.

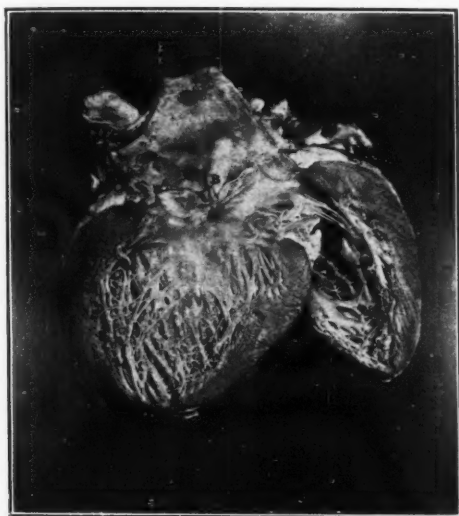


FIG. 1.—Rupture of the Aortic Valve. A—rupture of valve. B—tear in aorta.
(Montreal General Hospital A-25-1.)



FIG. 2.—Rupture of the Aortic Valve. A—rupture of valve. B—tear in aorta.
(Montreal General Hospital A-25-1.)

INCIDENCE

Rupture of the healthy mitral and tricuspid valves due to injury from external causes has been known to pathologists since the time of Marat and Corvisart,¹ but the earliest recorded case of rupture of the aortic valve is one by Plenderleath²⁵ in the *London Medical Gazette* of 1820. Since then some hundred odd cases have appeared in the world's medical literature.

A prolonged search through various *referate*, as well as the *Index Medicus*, the *Surgeon-General's Catalogue*, and the *Quarterly Cumulative Index*, reveals a surprising silence on the subject in many of the text-books of medicine and even in the monographs on heart disease. However, as the writer has learnt to expect, Osler² in his *Principles and Practice of Medicine* mentions rupture as a very rare cause for aortic insufficiency, and some of the older writers, such as C. J. B. Williams³ (1839), Thomas Peacock⁴ (1873), Dacosta⁵ (1874), Hilton Fagge⁶ (1877), G. W. Balfour⁷ (1898), Stern⁸ (1900) and Kuelbs⁹ (1909), also describe it in more or less detail. In the medical journals and theses, Quain,³³ Peacock,⁴⁴ Duroziez,⁶⁸ Barié,⁷⁰ Dreyfus⁸⁶ and Dufour,⁸⁷ have published cases of their own and collected all available reports from the literature. Dreyfus was able to find only forty-six cases up to the year 1896. The writer set himself the thankless task of combing the literature from 1830 to 1925 inclusive and succeeded in finding but 112 cases, all of which were not proven, however. The writer's case makes 113.

Cases of so-called "traumatic endocarditis" without valve rupture (Alvarenga,¹⁰ Gerhardt,¹¹ Mayr,¹² Riedinger,¹³ Leyden,¹⁴ Duems,¹⁵ Rumpf,¹⁹ Dieckman¹⁷) have been excluded and, of course, cases of proven ulcerative endocarditis (Williams,¹⁸ Packard,¹⁹ Peacock,²⁰ Salter,²¹ Orlebar,²² Rosenberg,²³ Byrom Bramwell²⁴), as this paper is concerned only with rupture of a healthy or diseased aortic valve from muscular effort or trauma.

CLASSIFICATION

There are two main groups to be considered: first, those due to muscular effort or *strain*; and, second, those due to *traumatism*. A third, small, group consists of cases in which the exciting factor is not stated.

The first group comprises sixty cases, of which only thirty were proved by autopsy (Plenderleath,²⁵ Henderson,²⁷ Corrigan²⁸ (case 2), Latham-Bence-Jones,³² Quain³³ (case 1), Quain-Jones,³⁴ Peacock³⁷ (case 1), Peacock⁴¹ (case 2), Meschede,⁴⁷ Foster⁴⁸ (case 1), Simpson,⁵² Williams,⁵³ Foster⁵⁷ (case 4), Pepper,⁵⁸ Burney-Yco⁵⁹ (case 1), Frew-Finlayson,⁶⁵ Greenhow,⁶⁶ Lindman,⁶⁷ Lewis,⁷⁷ Leyden⁷⁸ (case 1), Fraentzel,⁷⁹ Tretzel,⁸¹ Hektoen,⁸² Leyden⁸³ (case 2),

Jamieson,⁸⁹ Broadbent,¹⁰⁰ Heller,¹¹⁴ Anderson¹¹⁹ (case 2), Hoffmann¹²⁹ (case 4), Howard¹³⁷. The other thirty cases, though clinically probable cannot be considered as proven in the absence of a post-mortem record in twenty-nine. (Aran,³¹ Quain,³⁵ (case 3), Rawson,³⁶ Markham³⁹ (endocarditis?), O'Neil,⁴⁰ Peacock⁴⁴ (case 3), Peacock⁴⁵ (case 4), Foster⁴⁹ (case 2), Allbutt⁵⁴ (case 1), Burney-Yeo⁶⁰ (case 2), Peter⁶¹ (case 1), Peter⁶² (case 2), Orton-M'Aldowie,⁶³ Zohrab,⁷⁵ Cantley,⁸⁴ Launois,⁸⁸ Debove,⁹⁸ Ostwalt,⁹⁹ Horton-Smith,¹⁰² Dupuis¹⁰³ (case 1), Taylor,¹⁰⁴ Shaw,¹⁰⁵ Jorns,¹⁰⁸ Ereklentz,¹¹¹ Oliver,¹¹² Anderson¹¹⁸ (case 1), Allbutt¹²⁴ (case 3), Wolvins,¹³⁵ Emanuel-Roncoroni¹³⁶). Markham's case,³⁹ which was the only one in this group which came to autopsy, was in my opinion one of aortic insufficiency, due to an endocarditis of the aortic valve and not to rupture. Others besides Markham have made a similar mistake. Thus, no less a clinician than Gerhardt¹¹ reported a case of supposed rupture of the aortic valves, which later Sinnhuber¹¹⁵ stated was shown at autopsy to be due to a recurring endocarditis of the aortic valve and not to rupture. It is, therefore, wise to regard no case as acceptable without an autopsy record.

In the second group there are forty-seven cases recorded, but only fourteen were proved by autopsy: (Bouillaud-Bergeon,³⁰ Wilks,⁴⁶ Hayden,⁵⁰ Finnell,⁵¹ Foster⁵⁶ (case 3), Duroziez⁶⁸ (case 1), Barié-Potain,⁷² (case 3), Mader,⁷⁶ Biggs,⁸⁰ Strassmann,¹⁰⁷ Schmidt,¹⁰⁹ Tranquilli-Deganello,¹²⁰ (case 2), Steinitz,¹²⁵ Meyer¹³⁴). The Bouillaud-Tarrall²⁹ case came to autopsy, but, in my opinion, the perforation of the valve was not necessarily traumatic. In the other thirty-two, no autopsy was obtained after death, or the patients were still alive at the time the case was recorded (Leroy,⁶⁴ Duroziez⁶⁹ (case 12), Barié⁷⁰ (case 1), Barié⁷¹ (case 2), Barié⁷³ (case 4), Heidenhain,⁸⁵ Dreyfus,⁸⁶ Dufour,⁸⁷ Bernstein⁹⁰ (case 1), Bernstein⁹¹ (case 2), Bernstein⁹² (case 3), Lembke,⁹³ Schneider,⁹⁴ Guder,⁹⁵ Kantorowitz⁹⁶ (case 1), Kantorowitz⁹⁷ (case 2), Castiaux and Laugier,¹⁰¹ Calwell-Campbell,¹⁰⁶ Cahn,¹¹⁰ Sinnhuber¹¹³ (case 1), Sinnhuber¹¹⁶ (case 2), Sinnhuber¹¹⁷ (case 3), Schlecht¹²¹ (case 3), Schlecht¹²² (case 4), Zulzer,¹²³ Hoffmann¹²⁶ (case 1), Hoffmann¹²⁷ (case 2), Hoffmann¹²⁸ (case 3), Bensaude-Monod,¹³⁰ Cramer,¹³¹

Brossard-Heitz¹³² (case 1), Brossard-Heitz¹³³ (case 2)).

In the third, small, group of six cases the exciting cause was not stated, though all revealed at post-mortem a rupture of one or more of the aortic valves with a resulting aortic insufficiency; (Corrigan²⁶ (case 1), Rokitsky³⁸ (case 39), Bennett,⁴² Ellis,⁴³ Humphrey,⁷⁴ Fisher¹¹⁸). However, Fisher's case is so incomplete as to be unacceptable.

To summarize, we have records of 113 cases of rupture of the aortic valve, of which forty-nine were proven by autopsy. Of the two main groups, the "strain" group is the larger, comprising altogether thirty proven and thirty unproven cases compared with fourteen proven and thirty-three unproven cases in the traumatic group. In five acceptable cases the cause for the rupture was not stated.

PREDISPOSING FACTORS

Country and race: Among the "strain" group, sixteen proven and seventeen doubtful cases were reported from Great Britain; seven doubtful from France; eight proven and three doubtful from Germany; one doubtful case each from Italy and Holland; three proven cases from America; two proven and one doubtful case from Canada; and one proven case from Australia. As may be seen, therefore, by far the great majority of the proven and doubtful cases were reported from Great Britain.

In rather marked contrast is the geographical incidence of the "traumatic group": only four proven and one doubtful case from Great Britain; two proven cases from America; and one from Italy; while from France three proven and eleven unproven cases, and from Germany five proven and twenty-one unproven, are recorded. In this group, therefore, Germany leads, with France second. In the third group; four cases (three proven) came from Britain; and one each from America⁴³ and Austria.³⁸

Sex: Of the forty-nine proven cases of the three groups, the overwhelming majority (98 per cent) were males. In fact, only one female is listed among the "strain" cases and that doubtful, while among the traumatic cases, there were but three females, two of which were not proven cases. Evidently, therefore, the male

sex is more exposed to rupture of the aortic valve than the female.

Age: Of the "strain" group the age was stated in twenty-six of the proven and in twenty-six of the doubtful cases. In the former it ranged between 20 and 60 years with a mean of 37.2 years; in the latter from 20 to 68 years, with a mean of 37.4 years. The most susceptible decades were the fourth and fifth in both sub-groups. In those of the "traumatic" group, in which the age was stated, the range varied from 19 to 85 years in the proven cases, a mean of 45.6 years; while in the unproven group the variation was less marked (10 to 60) years, with a mean of 35 years. The most susceptible decades here also were the fourth and fifth. In short, the point of interest is that in the strain group the mean age was 37.2 years, in contrast to a slightly higher mean age for the traumatic group of 45.6 years.

Occupation: In the strain group of the thirty proven cases, the occupation is mentioned in twenty-seven, of which all but five (physician, apothecary, cook, clerk, and bar-tender) were exposed to constant or occasional muscular effort in their daily routine; for example, five were day-labourers, two dock-labourers, one brakeman, one butcher, one chauffeur, etc. In the unproven cases, the occupation was mentioned in twenty-nine, and in only six was the occupation of the non-laborious variety; of the six latter, the most interesting case occurred in a young pregnant mother during the act of labour. Among the arduous occupations are also mentioned, two day-labourers, two farmers, a ship-wright, a carpenter, a smuggler, a poacher, a bricklayer, etc. In short, in this entire group, 81 per cent of the cases occurred in occupations which exposed the patient to great muscular effort.

In the traumatic group, among the fourteen proven cases, the occupation is not mentioned in four; in the other ten cases (80 per cent), their occupations exposed them to injury. Thus, two cases were carters, two labourers, one soldier, one ship's-cook, one jockey, one coachman, etc. In these occupations, four sustained a fall to the ground from various heights, three were kicked by a horse, two received a blow on the chest from a fist or a piece of iron, and one was squeezed between a post and a cart-wheel.

In the unproven sub-group, there was the same variety of occupation, though in the great majority it was of the arduous type: among the twenty-eight cases whose occupation is given there were four labourers, four soldiers, one miner, one sailor, one locksmith, one stonemason, etc. Here by far the commonest cause for injury was a fall (sixteen cases) and next in order of frequency, a blow from a blunt instrument (ten cases); a not infrequent cause was a crushing injury to the chest wall (five cases).

Past medical history. The patients' history, as to alcoholic excess, syphilis, rheumatic fever, chorea or tonsillitis, and previous cardiac symptoms, is of course of great importance in determining a possible *locus minoris resistentiae*. This question will, therefore, be discussed before taking up the more accurate pathological criteria.

In the strain group, among the thirty proven cases, alcoholic excess is admitted in three cases only, denied in three, and not mentioned in the remaining twenty-four patients. In the doubtful cases, alcoholic excess was reported in four, absent in two, and not mentioned in twenty-four.

In the traumatic group the histories are more incomplete, even in the proven cases, but an abuse of alcohol was given in three cases before, and in one case after the accident; in ten histories no mention is made of alcohol. Of the thirty-three unproven cases, no one admitted to excess of alcohol, one denied it, and in the thirty-two other reports, no mention is made of it.

In the third main group which consists of five cases, in which the exciting factor is not stated, alcohol is not mentioned. In short, neither in the strain nor traumatic group does alcoholic excess play an important rôle.

In the strain cases which were proven, venereal disease was admitted only in the Frew-Finlayson case,⁹⁵ who had a chancre at 18 years of age, but without rash; in seven other cases it is specifically denied, and in twenty-two it is not mentioned in the history. In the unproven cases, syphilis appears five times in their records, (Zohrab,⁷⁵ Horton-Smith,¹⁰² Dupuis,¹⁰³ Taylor,¹⁰⁴ Emanuel-Roncoroni¹³⁶), though at the time of the accident the blood Wassermann was negative in one patient; in four others venereal

disease is denied, while in twenty-four histories no mention is found. Syphilis, therefore, in the strain cases does not appear as prominently as one might expect from the well-known predilection of syphilis for the aortic valve.

In the traumatic group, among the fourteen proven cases, there is no case of known lues; in three it is denied and in eleven others no mention is made of it. Among the thirty-three unproven cases, one admitted to gonorrhœa (Sinnhuber¹¹⁷ (case 3)); eight denied venereal disease and in twenty-four no mention is found.

In the third main group of five cases, venereal disease is not mentioned.

Rheumatism, chorea and tonsillitis, which are so important in the etiology of endocarditis, were present in five cases, negative in eleven, and not mentioned in fourteen of the strain group proven by autopsy. Arteriosclerosis existed in one case⁷⁹ of this group and had no doubt weakened the valve. Pulmonary tuberculosis, malaria, and possibly, a chronic infection from chronic eczematous ulcers of the legs occurred in each of three cases, and may have had a predisposing influence.

Among the thirty unproven cases in the strain group, rheumatic fever was present twice and chorea once, while in thirteen cases rheumatism is denied, and in fourteen others it is not mentioned. There was, however, a history of malaria twice, sepsis twice, pneumonia twice and influenza once, diseases which might have lowered the resistance of the aortic and valvular tissues. Hence in only seven of the entire group of 60 cases was there presumably a previous rheumatic endocarditis.

In the traumatic group, even among the proven cases, there was no case with a history of the rheumatic cycle; in three it was denied and in eleven no mention is made of it. One case (Tranquilli-Deganello¹²⁰) had furunculosis five years before the accident, and so, possibly, septicæmia. Of the thirty-three unproven cases one⁶⁶ had rheumatism since the accident; two others^{87, 122} before the accident; and one⁹⁵ had rheumatic purpura; in fourteen others the disease is denied, while in fourteen histories no mention is made of it. Hence, in the traumatic group of forty-seven patients, only four had, possibly, an aortic valve damaged by a previous attack of rheumatism. Two women^{29, 86} had repeated pregnancies; while two males had a pre-

vious malaria;^{69, 117} one measles and influenza⁸⁶ and one influenza alone,⁸⁷ while one patient had an active tuberculosis¹²³ and another was in the midst of a pneumonia,¹²⁸ when he fell out of bed.

In the third main group only one patient admitted to chorea.⁴³

Previous heart symptoms: Symptoms suggestive of a pre-existing valvular disease were present in only two cases^{58, 79} of the strain group proven by autopsy; in eleven others they were denied; while in seventeen of this group no mention is made of their existence. Presumably, therefore, though not conclusively, in only two cases did a valvular defect of any degree exist prior to the strain. Among the thirty unproven cases of this group there was a history of previous cardiac symptoms in three^{75, 84, 103} of the twenty in which this point is mentioned. Again, but a small minority had pre-existing heart disease, though, of course, only an autopsy would corroborate this belief.

Among the fourteen proven cases of the traumatic group in five it is stated previous heart symptoms were present, while in the other nine cases no mention is made of the previous state of the cardiac compensation. In the thirty-three unproven cases twenty-one definitely denied them, and in twelve no mention is made of them in the scanty case reports.

In the third main group previous heart symptoms are not mentioned.

MORBID ANATOMY

First, as to the cusp affected: Because of the great variation in the anatomical nomenclature for the aortic valve we had great difficulty at times in deciding which of the three aortic cusps was the one ruptured. The anterior aortic cusp is usually called the "anterior," sometimes the "septal" or "segment of closure"; the right posterior cusp of Gray's Anatomy is sometimes called the "posterior" and sometimes the "mitral"; the left posterior aortic cusp is frequently spoken of as the "middle" cusp. We have reduced all these terms to "anterior," "right posterior" and "left posterior" cusps. It is important to remember that from just above the anterior cusp the right coronary artery arises; and

from above the left posterior the left coronary arises.

While usually only one cusp is torn, sometimes two, and, rarely, three are affected. In the strain group, only one cusp was affected in eighteen cases, two in ten, and all three in two cases.^{57, 78} When only one cusp was involved, it was the anterior in seven cases, the right posterior in four, and the left posterior in two; in five other post-mortems the ruptured cusp is not specified. When two cusps were affected, it was the anterior and right posterior in two, the anterior and left posterior in one, and the right and left posterior cusps in two; in five other protocols the two cusps affected are not mentioned.

In the traumatic group, which comprised but fourteen cases, only one cusp was involved in ten; and two cusps were affected in four. Of the single cusp cases, in five protocols the exact one is not specified, while in two it was the anterior, in two the right posterior, and in one the left posterior. When two of the cusps were involved it was the anterior and right posterior in two, and the right and left posterior in two. There was no example of traumatic tear of all three cusps.

In the third small group of cases in which no exciting factor was stated, all five came to autopsy; of these the left posterior cusp was alone affected in two, while both the anterior and left posterior were simultaneously torn in two cases, and in one case the cusp affected is not specified.

From a study of these figures the most frequent single cusp to be involved is the anterior (nine cases); next, the right posterior (six cases), closely followed by the left posterior (five cases). If one, however, considers the cusp which may be most frequently torn, either singly or in combination with one or two other cusps, we find the anterior is still first (eighteen cases), the right posterior is next (sixteen cases), and the left posterior last (fourteen cases). This finding is somewhat contrary to the early teaching that it is usually the posterior cusps that are torn, but is quite in accord with the statement of Barié,⁷⁰ who found the cusp most frequently involved to be the anterior (which corresponds directly with the interventricular septum), as was seen in one of his seven experiments.

The site of the tear: There may be a rupture of the cusp itself (eleven cases), either at its free border or at its base, and but rarely in the middle of the cusp. As a rule, however, it is a vertical or longitudinal tear of the endocardium, or, rather, of the intima of the aorta, with a consequent displacement of the cusps (thirty-seven cases). As Peacock⁴ wrote in 1873, "It may be that the angles of one or more of the segments are torn from their attachment, or the convex edge of the valve may be separated from the fibrous zone, or the curtain may be torn through."

In our series the strain group revealed only three cases of rupture of the cusp itself, in contrast to nine due to a tear of the angle of attachment, and to sixteen due to a tear of the intima of the aorta near the base of the valve. In the traumatic group there were eight cases of rupture of the cusp itself, to only one of its angle of attachment, and to six of the intima of the aorta. In the small unclassified group, we find no case of rupture of the cusp itself, two of the angle of attachment, and three of the intima near the base of the valve. In the entire series, while the commonest site was a tear of the intima near the base of the cusp (twenty-five cases), rupture of the cusp itself, or of its angle of attachment, being almost equally frequent (eleven of the former and twelve of the latter), we seem justified in concluding that the cusp itself is more apt to be ruptured in direct traumatic cases, and the angle of attachment or the intima of the aorta near its base in the muscular strain group.

Now, as to the state of the valve itself at the time of the autopsy (but not necessarily at the time of the accident); in the strain group it was normal seven times, thickened or atheromatous eighteen times, once with evidence of fresh endocarditis, and four times its condition was not mentioned. In the smaller traumatic group the aortic valves were normal six times, thickened or atheromatous five times, with fresh endocarditis once, and twice their condition is not mentioned. In the third, very small, group the state of the valve is only mentioned in four cases; in three it was thickened or atheromatous, while in one it was covered with recent vegetations. What was specially interesting was that two cases re-

vealed a congenital anomaly of the valves.^{43, 74}

To summarize, therefore, in only thirteen of forty-eight autopsies, or 27 per cent of the entire series, was the aortic valve reported as absolutely normal, but it was more frequently normal in the traumatic group (44 per cent) than in the strain group (23 per cent). In the great majority of the protocols the aortic valves are described as thickened, atheromatous, or even calcareous. In two cases,^{33, 72} there was evidence of a fresh endocarditis in addition to the rupture, but in both cases it was probably of more recent origin.

The state of the aorta, and especially of the intima near the mouths of the coronary arteries, is of course of great interest. In the strain group the aorta was reported as normal in three cases, smooth but dilated in two and atheromatous in sixteen cases; in three of the atheromatous group there was some dilatation, and in one an aneurysm of the ascending aorta,¹¹⁴ while in two^{37, 83} others the mouth of one coronary was obliterated by a patch of atheroma. In the traumatic group, the aorta was both actually and proportionately more frequently normal (five cases), though in one of these it was dilated. In only four cases was there atheroma and in one of these there was also moderate dilatation. In one case of this group¹⁰⁹ there were multiple tears of the thoracic, and a single tear in the abdominal aorta. In the third, or unclassified, group the aorta was atheromatous in two. Unfortunately, no statement about the condition of the aorta was found in nine of the strain group, four of the traumatic and two of the unclassified. In Corrigan's²⁶ case only was the process in the aorta suggestive of syphilis, as the aneurysm in Heller's case¹¹⁴ resembles more a dilatation than a syphilitic one. In general, therefore, the aorta was much more frequently the site of atheroma in the strain group (sixteen cases) than in the traumatic.

As to the state of the heart itself: it was reported as hypertrophied in eleven, dilated in six, and both dilated and hypertrophied in nine of the strain cases; in not a single case was it normal, though in four cases the exact state of the heart was not stated. In the traumatic group, on the other hand, it was hypertrophied in one, dilated in three and both hypertrophied and dilated in six; in one case it was said to be

atrophied, while in three cases its condition is not stated. In the unclassified group it was found hypertrophied in two and not stated in three. In short, hypertrophy of one or both ventricles was the rule in all three groups, though frequently dilatation also existed. As to the condition of the myocardium itself, fatty or fibroid degeneration was reported in five cases of the strain group and two cases of the traumatic group. In addition, there was an abscess in the wall of the left ventricle in one case,¹³⁴ an aneurysm of the mitral valve in another,³⁷ two aneurysms of the right auricular appendage in another,⁸² and an adherent pericardium in another case.¹⁰⁷

The usual evidence of cardiac decompensation was found in many cases, especially venous stasis of the lungs, liver and spleen; in two cases hydrothorax, and in two other cases effusions into two or more of the serous cavities, were present. Pulmonary infarction occurred in but two cases;^{67, 137} thrombosis of the right axillary and brachial artery in one case,¹⁰⁰ and a thrombosis of the posterior tibial vein in our own case.¹³⁷ As might have been expected in the traumatic cases, laceration of the parenchymatous organs, liver and spleen or of the intestine occurred twice^{30, 109} and once⁴⁶ respectively. In this same group, fracture of the ribs,³⁰ dorsal vertebrae,^{30, 109} or of skull was also present in the odd case. An occasional finding was healed or active tuberculosis of the lungs.

PATHOGENESIS

Muscular effort or strain may result in rupture of a healthy valve, though this is naturally a rare event according to both Romberg and Allbutt, and, as already stated, occurred only seven times in our series. Muscular effort may lead to rupture of an aortic cusp more readily in a valve previously the site of rheumatic or syphilitic or arteriosclerotic disease; in fact many authorities recognize only this group. Of course, many of the case reports are so lacking in detail as to leave themselves open to the doubt of the presence of some previously existing gross, or at least microscopical, lesion. Lastly, muscular effort or strain may result in repeated mild attacks of valvulitis, and so predispose to subsequent rupture of the valve.

In answer to the question how muscular

effort causes rupture of a valve, Barié⁷⁰ states that during the effort the thorax is filled with air but is immobilized, and the intra-aortic tension is considerable, because during each diastole of the heart the aorta has to support an extreme pressure. Pepper⁵⁸ offers a somewhat similar explanation, "Immediately before the effort, whether at striking, or lifting heavy weights, a deep inspiration is taken, which aids in filling the cavities of the heart to their utmost, and then in order to afford fixed points for the contraction of the muscles of the arms and shoulders and back, the chest is held rigidly fixed. The violent contractions of the neck which follow compress the carotid arteries, while those of the muscles connected with the arms impede the free flow of blood through the subclavians and their branches. Thus, while the tension within the chest is greatly increased and the heart is stimulated to violent contraction, there is also an enormous elevation of arterial tension. The strain which results must extend itself directly upon the walls of the left ventricle, which must over-exert themselves to press forward the blood, and indirectly upon the aortic valves, which are compelled to bear the shock of a recoil of the blood stream violent in proportion." Heller¹¹⁴ believes the explanation of the fact that the predilection site of the tear during muscular effort is the first portion of the aorta is that in many persons the trachea is attached just above the aorta, and that the right bronchus in spastic respiratory arrest is pressed against the aorta. According to Potain, it requires a pressure of twenty to twenty-five c.c. of mercury to break the aortic valves. Barié's⁷⁰ experiments on the cadaver are of great interest. By increasing the intra-aortic pressure until it reached from 116 to 484 mm., of mercury, in ten cadavers dead from various non-cardiac diseases, he was successful in producing rupture of one or other of the aortic cusps in four; in two the septal segment (anterior), and in two the left segment (left posterior) were torn.

Trauma may result in rupture of an aortic valve segment, either (a) as a result of a contusion of the chest wall from a kick or a blow or compression of the chest; or (b) as a result of a violent shock to the body from a fall from a height. It must, however, be admitted, with

Allbutt, that in the history of some of these accidents the distinction between the outer and inner stress cannot be made, but probably in all the mechanical process is similar, the external blow violently compressing the thoracic cage.

Barié⁷⁰ and Potain experimented on the cadaver by administering three blows from a hammer on a board fixed to the præcordium: in two out of the five cadavers rupture of the aortic valve occurred; once in the median segment (left posterior) there developed an oblique tear extending from its free border to the attachment; and once a tear of the septal (anterior) cusp.

Dufour⁸⁷ has produced in four dogs a traumatic rupture of the aortic valve. His method was the administration of one to four blows with a mallet over the præcordium; post-mortem, several ribs were found broken and in all four dogs the water-test of the aortic ring was positive; the other valves were normal. In the first dog there was a tear of the right posterior and right anterior cusps; in the second dog all three cusps were torn; in the third, rupture of the right posterior had occurred at the insertion; in the fourth dog he found rupture of the right posterior cusp, from its free border to its base, and separation of the left posterior cusp from the aorta.

Kuelbs,⁹ in 1909, used a 40 cm. round meat-hammer, weighing 150 grams, and gave one to three sharp blows over the left thorax, the force of which as read by a dynamometer varied from 140 to 180 kilograms or more. The dogs revealed no evidence of pain, but merely of anxiety and shock. Two died spontaneously after the blow; the others were killed by bleeding and chloroform. The pulse was noted as rapid and irregular; heart murmurs became audible in six of the dogs. Post mortem, there were occasional small hæmorrhages into the pericardium, but more often hæmorrhages into the valvular endocardium, especially of the semilunar valves; a tear of an aortic valve occurred only once and that near the nodulus Arantii of one segment. There was often hæmorrhage into the myocardium. In short, 28 of the 34 dogs, or 82 per cent, showed valve hæmorrhages (mitral 12; aortic 7; pulmonary 4; tricuspid 5). Normal heart sounds were sometimes present when the post-mortem revealed a hæmorrhagic valve.

Further, valve hæmorrhage may occur without evidence of external injury to the skin, muscles or ribs.

SYMPTOMATOLOGY

The symptoms of rupture of the aortic valve are characterized by the suddenness of their onset and their severity, according to Broadbent.¹⁰⁰ The onset is sudden, as has been stated, but death does not immediately follow, as one might at first suspect. The commonest initial symptom is an agonizing pain, sometimes associated with the sense of a sudden tear within the chest. In many cases this is immediately followed by faintness, or even actual syncope, with complete loss of consciousness. When the patient regains consciousness, he usually immediately, but sometimes not for seven to fifteen days, notes palpitation of the heart, a sense of oppression, urgent dyspnoea, and the other symptoms of acute cardiac decompensation, such as cough, hæmoptysis, orthopnoea, cyanosis, restlessness, and œdema. Sometimes, too, the patient is conscious of a curious sound in his chest, which may be audible to others. In rare cases the onset of symptoms is neither immediate nor gradual, as described above, but much later in development, for in one case two years, and in another four years, intervened between the time of the strain or trauma and the actual onset of symptoms.

To summarize, therefore, the characteristic symptoms are (1) pain; (2) syncope, or faintness or vertigo; (3) oppression and dyspnoea; (4) palpitation and hæmoptysis; (5) sensation of a roaring in the chest, neck or ears, and finally; (6) the usual signs of aortic insufficiency.

The pain is acute, agonizing, tearing in character, referred to the præcordium or epigastrium, and usually with radiation down the sternum or to the neck and down the left arm and sometimes into the back between the shoulder-blades. It is said to be more frequent in the strain group than in the traumatic, and occurred forty-eight times in our series of strain cases and twenty-four times in the traumatic. There is sometimes the *angor animi* or sense of impending death, as in true angina pectoris. With the pain there is often a sensation of "something being torn loose" in the chest (three cases); or of "something snapping in

the chest" (three cases); or of "being stabbed" (one case), or more often of "something giving way" (seven cases). While usually immediate in its onset in the strain cases, it may not appear until three months later (one case), or only on exertion (one case). It was twice likened to angina pectoris.

To recapitulate: in the proven cases of the strain group pain was present in twenty-three cases (76.6 per cent); absent in two cases, and not mentioned in five cases. In the unproven cases it was present in twenty-six patients (86.6 per cent); absent in two; and not mentioned in two patients. In the proven cases of the traumatic group pain was mentioned in only five cases, in one of which it occurred with a sense of constriction in the chest and in another only on exertion. Among the thirty-two unproven cases pain occurred in nineteen and was not mentioned in thirteen. While the pain was usually noted immediately after the exertion, in four cases it did not make its appearance until a few days to ten weeks and in one case not until two years later. In short, pain is almost a constant symptom of rupture of the aortic valve due to strain (92 per cent), and is much less constant in the traumatic group (65 per cent).

Syncope or faintness or vertigo may sometimes be present, but have not been stressed by former writers. However, in eighteen of the proven strain cases, in which these symptoms are mentioned, syncope occurred in six and faintness in four; in one case weakness and in another vomiting occurred at the time of the accident. Among the twelve of the unproven strain cases, in which these were noted, syncope occurred in six patients in one of whom it lasted for eighteen hours, and in another of whom it was followed by vertigo. In three patients only faintness was noted. In the entire group, syncope, faintness or vertigo was noted, therefore, in nineteen out of sixty patients, or 31.5 per cent. In the fourteen proven traumatic cases the history is less complete, but one or other was present in three cases; in one the syncope lasted for forty and in the other for ten minutes; in the third case only faintness occurred. Curiously enough, among the thirty-two unproven traumatic group, fifteen patients suffered either from syncope, shock, faintness or vertigo. Of these

twelve had complete loss of consciousness (one of four days' duration; another of one day) which was followed in three by vertigo; one had vertigo only; one, faintness and one had shock without loss of consciousness. In the entire group of forty-seven cases, eighteen suffered from cerebral manifestations, or 39.1 per cent.

Oppression and dyspnoea: Among the thirty proven cases of the strain group, one or other of these symptoms was rather constant, being present in twenty-three, absent in three and not mentioned in four (76.6 per cent). They usually appeared immediately after the accident, and independently of further exertion, but in four patients the dyspnoea first made its appearance in from four weeks to three months. In twenty of the unproven cases of the same group dyspnoea was present, in three absent, and in seven no mention is made of it, (66.6 per cent).

Among the fourteen proven cases of the traumatic group, it was present in eight cases and not mentioned in six (57.1 per cent). In three patients it only appeared in from a few days to ten months. In the larger unproven traumatic group these symptoms were present in thirty-three, absent in two, and not mentioned in seven cases, (71.8 per cent). In five cases the onset of dyspnoea was from several days to several months after the trauma. In one case it was evidently paroxysmal in character.

Palpitation and hæmoptysis were comparatively rare symptoms, but sufficiently frequent to merit consideration. Palpitation occurred once in the proven cases of the strain group and eight times in the unproven cases; among the traumatic cases it was present once in the proven cases and eight times in the unproven cases. In the strain group hæmoptysis occurred once among the proven, and twice among the unproven, and not at all among the proven cases. Hence, it may be concluded that palpitation is more frequent than hæmoptysis, but the absence of either does not signify. The hæmoptysis is probably due to pulmonary infarction, as was noted in several of the autopsies.

Sensation of roaring in the chest, neck or ears: This is certainly a peculiar symptom, and was described by the patient as resembling the "croaking of a frog",⁵² "the cooing of a

dove",^{63, 65} a "rumbling, rustling noise",⁸² a "humming noise",⁶⁰ a "whistling noise",⁷⁵ a "musical murmur or thrill",^{103, 137} a "buzzing in the chest",^{104, 121} a "peculiar sound in the chest",^{33, 40, 94} a "rattle in the head",⁹⁵ "a whirring noise".⁵⁸ In most patients it was constant, but most troublesome at night, disturbing their rest. In one patient it was increased by exertion. In twelve patients this sound was audible to the friends or family. This phenomenon was apparently more frequent in the strain cases, occurring among nine of the proven and eight of the unproven group. It was not mentioned among the traumatic proven cases, but was present in four of the unproven cases.

To summarize, then, a murmur was audible to the patient or his friends in nineteen of the strain series and four of the traumatic.

Signs of aortic insufficiency: The usual signs, such as a widespread area of pulsation, increased force of the heartbeat, increased area of dullness, an aortic diastolic murmur of maximum intensity at the base, a capillary pulse, Duroziez' sign, and a low diastolic blood pressure, were noted in the majority of cases. Thus in twenty-five of the proven and thirty of the unproven strain cases one or more of these signs are noted, and always, at least, the aortic diastolic murmur. Again in nine of the proven and thirty-two of the unproven traumatic cases at least a diastolic murmur was noted. In only five of the proven strain cases and five of the proven traumatic and in four of the "not stated" group is no mention made of the physical signs. The diastolic murmur was often somewhat remarkable in its quality and distribution. According to Strassmann,¹⁰⁷ it is often longer, more intensive, and of a peculiar tone. Foster⁴⁸ believes that the diastolic murmur frequently has a special blowing and flapping character, instead of the soft quality of the murmur of aortic insufficiency due to endocarditis. Again, it was termed "harsh" or "intense" in nine cases, "prolonged and loud," "gushing," "rumbling," "creaking," "flapping," "rough and flapping," "rasping or piping," each in one case. In six cases it was merely described as musical, without other qualification; while in nine other cases the musical quality was modified by such terms as "sibilant" (two cases), "vibrating," "tone like the vibration of a string," "piping," "buzzing," "purring."

"like a torn sail," "siren-like" (each in one case). The murmur was audible to the physician in some cases of the strain group several inches from the chest. Thus in Quain's⁸³ case it was described as audible several inches from the chest, and in Tretzel's⁸¹ at three metres; in one of Hoffmann's¹²⁰ cases it was audible "some distance" from the chest. Among the unproven strain cases, it was noted by O'Neil⁴⁰ as audible at six feet, by Burney-Yeo⁵⁹ three feet, and by Dupuis¹⁰⁸ fifteen to twenty centimetres. Among the traumatic cases it was audible at fifty centimetres in the Tranquilli-Deganello¹²⁰ case as well as in Barié⁷⁰ case; twenty-five centimetres in Schneider's⁹⁴ case, and "several centimetres" in Schlect's¹²² patient.

A diastolic thrill was occasionally palpable over the base, being noted twice in the proven and five times in the unproven cases of the strain group. In not a single instance was it noted in the traumatic group.

An aortic systolic murmur was heard in thirteen of the proven and in fifteen of the unproven cases of the strain group. In the traumatic group it was somewhat the same, being noted in eight of the proven and twelve of the unproven cases. It was usually widely distributed over the præcordium and invariably of maximum intensity at the base, though once or twice loudest at the apex, and, possibly, therefore, due to a relative mitral insufficiency. This murmur was described as "loud" four times; "rough" four times; "musical" twice; and "harsh," "vibratory" or "flapping" once each. In addition, a systolic thrill was felt over the base in three of the proven strain cases and in two of the unproven traumatic group. It has been suggested that the presence of the systolic murmur and thrill can best be explained by the torn segment floating in the blood stream.

DIAGNOSIS

A diagnosis is possible if the previous condition of the heart is known, but, of course, without the proof of a post-mortem examination this cannot be considered as conclusive. Rupture of the heart wall, or of the aorta itself, must always be excluded, according to Dufour.⁸⁷ We are inclined to agree with the latter that there is no certainty in any case, especially when one recalls that no less a

clinician than Gerhardt, of Berlin reported a case as clinically certain, but which three years later revealed an endocarditis without evidence of rupture. Meyer¹³⁴ emphasizes the absence of cardiac hypertrophy in the traumatic-rupture cases, and based his diagnosis on this point. In the series of one hundred and thirteen cases, only forty-nine came to autopsy and in only six was the clinical diagnosis made correctly, namely by Pepper,⁵⁸ Burney-Yeo,⁵⁹ Potain,⁷² Tretzel,⁸¹ Meyer,¹³⁴ and our own case by my resident, Dr. E. S. Mills.¹³⁷ In twenty-one cases no clinical diagnosis was made, while in eight the diagnosis was merely aortic insufficiency, and in one other aortic insufficiency wrongly associated with an aortic aneurysm. Strassmann¹⁰⁷ was content to make a diagnosis of "traumatic heart insufficiency." Six cases were absolutely wrongly diagnosed; one as indigestion, one as ulcerative endocarditis, two as aortic aneurysm, one as aortitis with angina, and one as cardiac failure.

PROGNOSIS

This depends first upon the size of the defect, and, secondly, upon the efficiency of the heart muscle. In accordance with these factors, an immediate fatal syncope may result, or there may gradually develop a circulatory stasis, with increase in the size of the liver, œdema of the lower extremities from dilatation of the right ventricle, and death some weeks or months later. This is the most common course. In some cases there may be temporary comfort for a couple of weeks or even months, and then the appearance of symptoms.¹⁰⁰ Again, years may elapse before symptoms manifest themselves, if the previous state of the myocardium is healthy. Thus, Balfour,⁷ in his monograph of 1898, writes "But I myself have seen *post mortem* cusps which had been torn from their attachments; the lesion healed and yet no serious symptoms till years subsequently. At the moment I am acquainted with a patient who more than twenty years ago had symptoms and signs apparently due to rupture of one of his aortic cusps, yet he still survives in much improved health."

Rarely, a chronic aortic insufficiency may result without symptoms. Fraentzel,⁷⁹ as well as Castiaux et Laugier,¹⁰¹ have reported cases, which at autopsy showed repair of a small tear.

Foster⁴⁸ makes a nice point when he states that if the right posterior cusp is ruptured the diastolic murmur will be transmitted to the apex, when a better prognosis can be given, because there is no opening of a coronary near this aortic segment, and so there will be less interference with the nutrition of the heart muscle.

The duration of life, then, varies from a few hours or days to several years. In the thirty proven strain cases one death²⁸ was immediate, in another⁴⁷ it occurred in fourteen days, and in a third⁷⁷ in fifty-one days, and in the remaining twenty-two in which the duration of life is given, it ranged from three months to five and one-half years, with an average duration of life of a little more than eighteen months. In fourteen of the traumatic group proven by autopsy the duration is given for thirteen cases. In one³⁰ death was immediate; in another⁵¹ a few hours, and in a third¹⁰⁹ but two hours intervened; one³⁶ survived three days. On the other hand one case⁷² survived ten years, and another¹²⁵ eleven years and one month. The mean duration of this group is, accordingly, forty months for those that survived the immediate effects of the trauma. It would seem, therefore, that the prognosis is better in the traumatic than in the strain cases. There is no use in discussing the duration of the life in the unproven cases, though it is interesting to remember that in one of Barié's⁷⁵ cases, fourteen years have elapsed, and this too is a traumatic case; another of the doubtful traumatic cases²⁹ lived twenty years.

TREATMENT

In the event of a suspicion of rupture of an aortic valve from strain or traumatism, the indications are first absolute bed-rest, in an endeavour to avoid all causes likely to give rise to inflammation of the valve, and, second, to subdue such symptoms as may arise. Later, one must insist upon great caution in exercise and an avoidance of all forms of excitement and the use of depressant agents. Peacock, accordingly, strongly advises against the use of digitalis. Generally speaking, an ice-bag to the præcordium, and possibly venesection, will relieve the patient. Later, purgation and diuresis may be tried.

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FISH TAPEWORM*

INTESTINAL INFECTION IN MAN: THE INFESTATION OF FISH IN MANITOBA LAKES.

BY DANIEL NICHOLSON, M.D., M.R.C.P. (LOND.),

*Assistant Professor of Pathology, Faculty of Medicine, University of Manitoba;**Assistant in Pathology, Winnipeg General Hospital,**Winnipeg*

TAPEWORM infection has always had an unusual interest because of the great size of the parasite. This has led to an early discovery of its life cycle. The main varieties affecting man occur from eating larva-infected beef, pork or fish. Hitherto, the types derived from beef and pork have been commonest in this country. Now, however, they are becoming rarer, while the fish type is becoming more frequent, and it is the most serious of the three.

The symptoms of tapeworm infection vary greatly. A voracious appetite is the exception rather than the rule. Some desire only highly seasoned food. The symptoms of which a tapeworm-infected patient may complain are common to many abdominal diseases. They are: colicky abdominal pains, alternating constipation and diarrhoea, nausea, particularly when the stomach is empty, dizziness and neurosis. Frequently, symptoms appear about the time the patient notices the first segments of worm in the stool. There are no typical signs of tapeworm infection. Eosinophilia is present in so small a percentage of cases that it is not valuable in diagnosis.

Two most important points in the diagnosis of fish-tapeworm infection are: first, to ascertain whether the patient ever eats uncooked fish which is likely to be infected, and second, if segments of the worm have been noted in the stool. Fish-tapeworm segments may be readily differentiated from those of other varieties of tapeworm; they are broader than they are long and the uterus forms a small yellowish dot in the centre.

Patients who pass large segments of the worm at frequent intervals rarely have anæmia. The anæmia occurs in only about 1 per cent of those infected, and it may vary from a very slight to the most profound pernicious aplastic type. A person may be infected with fish-tapeworm for

several years before developing anæmia. It is a remarkable fact that in patients who suffer from anæmia due to tapeworm the segments are rarely cast off in the excreta but undergo degeneration in the bowel. To exemplify, the following cases are briefly reported:

CASE 1

A. P., aged 11 years, of Scottish extraction and born in Winnipeg, entered the Children's Hospital under the care of Dr. O. J. Day complaining that during the past 6 or 7 months she had passed about 40 feet of tapeworm. She had an eager appetite, was losing weight, and was becoming nervous.

Treatment by purgation and *felix mas* caused the patient to pass a worm nine feet in length with the head intact. Examination of the segments which were three times as broad as long showed a rosette uterus containing oval eggs. This would definitely identify the worm as *D. latum*. This is the first case of *Diphyllobothrium latum* infection in a patient born in Winnipeg that has come to my notice.

CASE 2

Mrs. S. B., 57 years of age, a Jewess who had come from Russia twenty-two months before, was admitted under Dr. Charles Hunter's service to the Winnipeg General Hospital, May 27, 1926. She complained of the passage by bowel of long, white, ribbon-like strands, nausea, and abdominal discomfort. Two months previously, and seven months previously, she had passed segments several yards long. For the past seven months she had been nauseated and her appetite poor; she could eat only highly seasoned food. She had lost twenty pounds in the preceding year.

She was a healthy-looking woman who showed no physical signs of any importance. A blood examination showed 65 per cent hæmoglobin and 3,600,000 red cells, giving a colour index of 0.9. The blood smear showed a definite variation in size of the red cells. There was no irregularity of outline, but some achromia was present. The white cell differential count was normal, the eosinophiles constituting only 2 per cent. A vermifuge was followed by a large mass of fish tapeworm and one head.

CASE 3

S. Z., consulted Dr. A. Hollenberg in October, 1927, complaining of weakness and pallor. He had not been digesting his food well during the past several years, and in 1924 his appendix had been removed for this, but without relief. He had come from Russia in 1922.

Physical examination showed a well developed man with a yellow tinge to his skin, but in other particulars was essentially negative. There were no nervous or sensory disturbances. A blood examination showed a hæmoglobin content of 65 per cent; and 2,500,000 red cells, giving

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a colour index of 1.3. The white blood cells were 8200 per c.mm. and an examination of the blood smear showed an unusually large percentage of eosinophiles. A saline purge, before and after male fern as a vermifuge, caused the patient to expel about twenty feet of *Diphyllobothrium latum*.

CASE 4

V. P., a young man 22 years of age, who came to Canada from Finland a year ago, developed in the last five months a severe anaemia of the pernicious type. After coming to Canada in February, 1927, he stayed in Vancouver for two months and then came to Manitoba, where he worked near the San Antonio mine. On December 30th he was admitted to the Winnipeg General Hospital under the care of Dr. A. J. Burrige. He complained of alternating constipation and diarrhoea, weakness, blurred vision and he noticed that his skin was pale. In June, while working in the bush, he began to have alternating constipation and diarrhoea, each lasting three or four days. When constipated he would vomit frequently after a meal. At no time did he notice any worms, blood or pus in his stool. Along with the gastrointestinal disturbance he had a poor appetite and suffered from progressive weakness. Two weeks before admission to hospital his pallor was so marked that he noticed it himself. His face was swollen and his vision blurred.

Blood examination showed a severe aplastic anaemia with haemoglobin of 21 per cent (Newcomer method); red cell count 1,200,000; platelets 45,000; and white cells 3,700 per c.mm. The smear showed 3 per cent eosinophiles. The red cells in the spread were very scanty and showed great variation in size, with many large forms and a marked hyperchromia of all except the very small cells. (See Fig. 1).

Examination of the stools by the concentration method showed numerous ova, as in Fig. 2. Only by this examination could a correct diagnosis be made in this case.

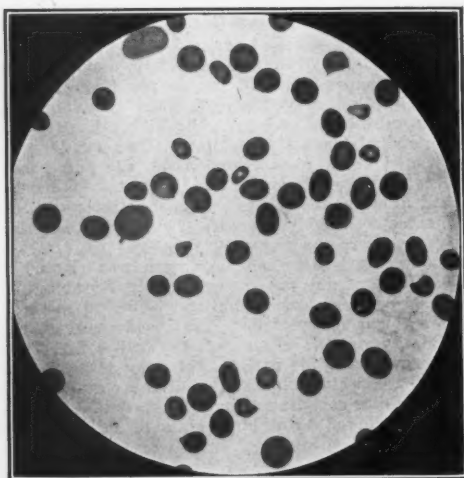


FIG. 1.—Blood film from Case 4 (x500, 1 mm. = 2 μ) showing scanty hyperchromic cells with great variation in their size and many large forms.

EXAMINATION OF FÆCES FOR OVA

This examination is very important and is easily done, but because we do not like to examine faeces it is too frequently neglected.

The examination, as usually done, often consists in viewing a very small particle of excreta under the microscope for a moment and rendering a negative report. Ova will frequently be missed by such an examination.

A concentration method is best. It depends on the rapid settling of the ova. The following is the least objectionable and most easily performed. Because of its importance I shall describe it in detail. Do not order a purge before collecting the specimen. Collect a mass of faeces, somewhat larger than a hen's egg, in a quart-sized, wide-mouthed fruit-sealer containing an ounce of formalin and a pint of water. The formalin destroys the disagreeable odour, which is the greatest objection to the examination of faeces. Break up any firm masses with a spatula. Cover the jar tightly and shake it vigorously for half a minute. Allow two minutes for the sediment, which consists of faecal particles and ova, to settle. Pour off the supernatant fluid, and again fill the jar two-thirds full with fresh water. Cover and shake as before. Then, strain the contents through a layer of coarse gauze into another glass jar. Most of the ova will go through the gauze but the large particles of faeces will be held back. The ova are heavy

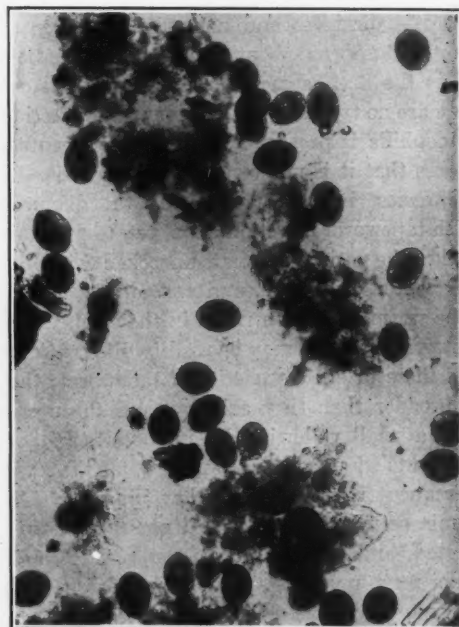


FIG. 2.—Ova of fish tapeworm as seen with the low-power lens and x10 ocular. (x100).

and they settle as a dark brown sediment in less than two minutes. Transfer a drop of this sediment by means of a pipette to a glass slide. Put on a cover glass and examine under the low-power lens of the microscope with subdued light.

When ova are present no doubt exists even in the mind of one unacquainted with their appearance. They appear as numerous large oval bodies of uniform size and shape (see Fig. 2). The outer membrane is thin and more than a dozen spheres make up the contents. By pressing the cover slip the membrane at one end sometimes separates like a lid and the contents of the ovum may be extruded. There are no other particles in the faeces so unvaried, and if one is in doubt whether or not a few irregular, roundish bodies are ova it is almost certain they are not.

INCIDENCE IN WINNIPEG

The records of the Winnipeg General Hospital show 15 cases of fish tapeworm infection during the past four years. Five of these occurred during 1927. The three cases of associated anæmia noted would make an unduly high percentage. This may be due to the small series or to the presence of anæmia making an infected patient seek hospital care. The hospital records have no index of diseases from 1912 to 1923. Previous to 1912 the annual reports which date back as far as 1886 contain a classified list of the diagnoses with the number of cases of each disease. The earliest mention of a tapeworm was in 1892 and that was a *T. solium*. From that date till 1912 one to five cases of *T. solium* or *saginata* occurred yearly. The irregular sequence of these would lead one to question the classification of type. There was no mention of fish tapeworm.

The infection is frequently treated out of hospital, sometimes by giving a vermifuge as a therapeutic test, so that the records stated are only a fraction of the total incidence. Although this is true and the hospital capacity has increased from 125 beds in 1892 to 650 beds in 1927 the infection is probably on the increase.

MODE OF SPREAD

Tapeworm infestation is commonest among our new Canadians from Russia and other countries around the Baltic Sea, as they still have the habit of eating uncooked fish with salt. Of all the cases noted only one was native born. The longest residence in Canada was eighteen years. Many are fisherman and, if infected, the ova from their excreta soon reach our lakes. Dogs may also act as hosts.

It is very striking that the tapeworm infestation occurs in many Jewish women but not in Jewish men. This may be attributed to the women handling the fish before it is cooked, or, probably, it is due to their tasting a special dish called "Gefilte" fish, to determine the correct amount of seasoning before cooking it. This is prepared by mincing fish with onions, peppers and other spices, rolling it into cakes, which are covered with the fish skin and then cooked.

Very probably Cases 2 and 4 had the tapeworm before coming to this country. Dr. A. Hollenberg found that all the infected patients he saw in 1927 ate herring imported from Norway. Previously, when their herring supply had been brought from Alaska, no cases had come to his notice. However, as the pike and pickerel from Lake Winnipeg are definitely infected, human infection will develop from eating them uncooked.

THE LIFE CYCLE OF THE PARASITE

Starting as the larval form in the flesh of fish, the fish tapeworm, *Diphyllbothrium latum*, formerly known as *Dibothriocephalus latus*, when eaten uncooked, will attach itself by the sucker slits in its head to the small bowel of man, dog, cat or fox, and grow, developing segments very rapidly. It comes to maturity and casts off eggs in from three to four weeks. Each segment has in its central part a uterus and ovaries, and in its peripheral part testes and vas deferens, so that each ovum is fertilized as it leaves the genital opening in the segment. The worm may live for several years. When many are found in one individual they frequently do not attain the great size and length that a single one does, though Dr. J. C. Todd¹ has reported a patient who had six tapeworms, totalling seventy-five feet in length, and they

produced no disability to the patient. If large segments are freely passed there are no eggs passed separately. This occurs when the patient's intestine has an active peristaltic habit. Usually, however, one infected patient scatters many ova. On three occasions a gram of faeces from Case 1 was emulsified in 25 c.c. of water and 0.1 c.c. of the homogeneous emulsion examined for a count of the ova present. By this means it was estimated that the patient probably expelled 36,000 ova daily. In all processes of fertilization much of the seed perishes, but undoubtedly many of these ova have reached our streams and lakes to infest the fish therein.

The excreta containing the ova find their way into the waters of streams and inland lakes and the eggs hatch in two weeks, producing a ciliated embryo known as the oncosphere. This is devoured by one definite species of small crustacean, less than one-sixteenth of an inch in length, the *cyclops strenuus*, where it bores its way through the intestine into the body-cavity and undergoes development for two weeks. As "eat and be eaten" is the law of the sea, this small infected cyclops is devoured by the pike, pickerel, perch and trout. These fish are found near the shore, the white fish and other deep water fish which remain well out from shore are not affected. Salt water fish are likewise free. The larva burrows through the wall of the gastrointestinal wall of its host, to infect the abdominal organs and the muscle flesh, where it remains as a small white worm one-quarter to one-half inch long and about one-sixteenth inch wide, frequently doubled on itself, and surrounded by little or no capsule. On magnification, it takes on a more definite worm-like outline, as seen in Figs. 4, 5 and 6.

LARVAL FORM
(Plerocercoid) in
flesh of fish, pike,
pickerel or trout,
which eat the
infected cyclops.

INTESTINAL PARASITE
in man, dog, fish, or cat,
who eat infected fish.

LARVAL FORM,
(Plerocercoid) in the
body cavity of a
small mollusk, the
Cyclops Strenuus,
which eats the
ciliated embryo.

OVA, in excreta,
washed into the
stream or lake.

CILIATED SWIMMING
EMBRYO (Oncosphere)

CHART 1

HISTORICAL

Tapeworm infestation in general has been observed from the earliest times. It may have been one of the reasons for Moses forbidding the Jews to eat pork and for the Mohammedans in Egypt also to abstain. The ancient Greek physicians recognized and described quite accurately intestinal tapeworms. In 1685 Tyson described the head of the tapeworm, and in 1758 Linnaeus first described the fish tapeworm. In 1851 Kuchenmeister demonstrated by actual experiment that the larval forms in flesh, when fed, give rise to intestinal parasites. A monograph on fish-tapeworm anæmia by Schaudmann,² of Helsingfors, Finland, in 1894, described all the essential features of the clinical manifestations and the mode of infection. It is a classic. The only item to be added since is the observation of Janicki and Rosen in 1917 that the ciliated embryo, on leaving the egg, is taken up by the cyclops, a small mollusk which in turn is eaten by the larger fish. Formerly it was thought that the larger fish swallowed the embryo directly.

Dr. Scott Warthin, of Ann Arbor, and Dr. T. B. Magath, of Rochester, are among the active investigators of the disease. Dr. Warthin³ published a record of a girl aged five years, a native-born American, who was infested with fish tapeworm.

From South Bend, Indiana, Dr. Lyon⁴ published what he believed to be the ninth case of native infestation by fish tapeworm in a Jewish boy aged four years. The boy had never been farther away than Dowagiac, Michigan. No other members of the family were infested. Much of the fish they ate was caught in the Great Lakes. South Bend sewers empty in St. Joseph River, which flows into Lake Michigan.

In 1906, Nickerson reported fish-tapeworm infestation in a child of Finnish parents but who had been born and had lived all his life in Ely, Minnesota. He also found larvæ in the flesh of fish from neighbouring lakes. Dr. Magath⁵ found many cases of fish-tapeworm infection among the Finnish people in the region of Ely. He found the fish from Minnesota lakes heavily infested with larvæ, which by feeding experiments he developed into typical *D. latum*. Some patients who had

tapeworm, and were living in Winnipeg, were seen by him at the Mayo clinic.

During the period of my investigation of the fish in Lake Winnipeg and Lake Manitoba, the most complete report yet published of infections occurring in American fish was given by Vergeer⁶ of Ann Arbor, Michigan. He examined very thoroughly many varieties of fish in the Michigan waters, and found larvæ in the pike and barbot. He fed the larvæ to five dogs and one cat and produced typical adult forms of *D. latum*. He demonstrated that barbot may contain the larvæ of *D. latum* and another species of bothriocephalid. He found the larvæ in pike imported to the United States from Lake Winnepigosis and Lake Manitoba, though he does not state that he produced the adult form for identification by feeding these larvæ to animals.

EXAMINATION OF FISH FROM LAKE WINNIPEG AND LAKE MANITOBA

The following is a list of the fish I examined from January 10 to March 3, 1928.

Fish	Date of Catch	Locality	Number of Larvæ Found
9 Pike (<i>Esox Lucius</i>)	Winter 1927-8	L. Winnipeg	0.
1 "	Summer 1927	"	3.
1 "	" "	"	More than 15.
1 "	" "	"	More than 28.
3 " (large)	" "	"	0.
5 "	" "	L. Manitoba	0.
1 "	" "	"	at least 5.
5 "	Winter 1927-8	L. Winnipeg	0.
1 "	" "	"	8 very small forms
6 "	" "	"	0.
1 "	" "	"	19.
1 "	" "	"	5.
5 Pickerel (<i>Stizostedion vitreum</i> Mitch.)	" "	"	0.
1 "	Summer 1927	"	7.
1 "	" "	"	at least 3.
6 Gold Eye (<i>Hyodon chrysopsis</i> Rich.)	" "	"	0.
4 Suckers (<i>Catostomus catostomus</i> Forster)	" "	"	0.
3 Tullibee (<i>Leucichthys tullibee</i> Rich.)	" "	"	0.
6 Herring (<i>Leucichthys artedii</i> Le Sueur)	" "	"	0.
12 Whitefish (<i>Coregonus clupeaformis</i> Mitch.)	" "	"	0.

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The variety locally known as pickerel (*Stizostedion vitreum* Mitch) is known in some parts of the United States as wall-eyed pike. It is also frequently confused with the sand pike (*Stizostedion canadense* griseum).

For most of the fish examined I am indebted to Mr. Arthur Rigby, Chief Food Inspector for the City of Winnipeg. He was able to obtain from the cold storage plants summer-caught fish, which have more numerous and larger

larvæ in their flesh than winter-caught ones. Three very large pike (*Esox*), about two and one-half feet long, contained no larvæ in their flesh muscles. Some of the patients who were infected with tapeworm contributed fish which they had purchased from their local dealers. The department of pathology purchased the remainder from Winnipeg fish dealers.

The pike (*Esox*) is a very voracious fish. Its mouth and throat is almost funnel-shaped, and it is able to ingest a fish half its own length. The part of the ingested fish near the pylorus will be partially digested while the remainder nearer the mouth does not show any change. It was a great surprise to find the intestine of some of the pike very heavily laden with small tapeworms. They varied in length from two to eight inches and reached one-eighth inch in width. The head was armed with two pairs of steer-horn-shaped hooklets on each side, as shown in Fig. 3. The hooklets are slightly bent toward the head by the cover glass. As I was unacquainted with this type, I consulted Mr. F. Neave of the Department of

Zoology, University of Manitoba, and Mr. A. Bajkov, prairie lakes investigator of the Biological Board of Canada. They thought it probably *Triænonophorus nodulosus* Pall., a tapeworm which commonly infests the intestine of the pike, perch salmon, grayling, pickerel and eel. Its life cycle is unknown. I am also indebted to Mr. Neave and Mr. Bajkov for the classification of the fish which I dissected.

All of the fish which showed larvæ in their



FIG. 3.—Head of small tapeworm (x20) from intestine of the pike.

flesh also showed them in their viscera, chiefly in the liver, peritoneum, or egg-sac. These were not recorded or used for feeding experiments, because only larvæ in the flesh are dangerous to man.

The method used was first to remove the skin of the fish and then, with a very sharp knife, pare off thin slices. When the larva is present it is easily seen with the naked eye. It appears as a tiny, opaque, white worm, less than $1/16$ of an inch wide and from $1/8$ to more than $1/4$ of an inch in length, and may be lying straight, bent on itself once, or coiled up. The fish flesh is very translucent in contrast with the opaque worm. This contrast is increased by pressing the fish flesh between glass plates. Even after the fish had been in



FIG. 4.—Large larva from infected pike (x13) showing segments and the head withdrawn. The tail was curled around an air bubble.



FIG. 5.—Larva from infected pike (x28). The head is withdrawn and appears as a round mass at the right. The body movements blur the photograph.

cold storage for months, most of the larvæ moved about when freed from the muscle and subjected to the warm temperature of the room. A drop of warm water made them especially active. The larger forms contained definite segments and a head that would retract to form a large rounded ball (Fig. 4). Then the head as a tiny point would extend from the centre. This would be followed by the body of the worm drawing itself up to the extended head. Some of the heads showed a longitudinal slit.

The larval form photographed in Fig. 5 was very active. A contraction-wave would pass down from the head to the tail and there was side-to-side motion as well. Under a magnification of 100 diameters, one could easily discern a streaming of granules, most rapid at the point of contraction, and moving towards the head, while the contraction moved in the opposite direction. This produced some blurring in certain areas, even on quick exposure. On adding a drop of 5 per cent carbolic acid this larva



FIG. 6.—Larva pictured in Fig. 5, after applying a drop of carbolic acid to stop its movements. (x13).

shortened itself up and ceased moving, when Fig. 6 was taken.

IDENTIFICATION OF ADULT TAPEWORM BY FEEDING EXPERIMENTS

Finding larvæ, as already described, in the flesh of fish does not prove that they are *D. latum* (*Bothriocephalus latus*). Only by feeding these larvæ to dogs can the adult form be developed and identified. Slices of fish muscle containing fish larvæ were used for these experiments. The larvæ were not dissected out and counted. Altogether six dogs were used for the experiment but two had to be discarded, one because he would not eat fish, and the other because he was already infected with tapeworm (*Tænia solium*). Strict precautions were taken at the beginning of each experiment to make sure that the animals were not already infected. The dogs were put in separate cages and three consecutive specimens of stool from each dog were examined for ova or segments of intestinal parasites. The one which was infected showed ova on the three examinations, and later a vermifuge caused four well-formed specimens of pork tapeworm to be expelled. The other dogs, although their stools showed no ova, were given a vermifuge as an extra precaution. This consisted in omitting the evening meal and administering one-half ounce of magnesium sulphate by means of a stomach tube passed through a hole in a wooden bit which is held firmly between the dog's teeth. Next morning a dram of liquid extract of male fern, made up into an emulsion, was administered in the same manner, and at noon a final half ounce of magnesium sulphate was given. None of the dogs used for the experiments passed any segments of tapeworm. The dogs were then fed on puppy biscuits for two days to remove any trace of the anthelmintic that might remain and kill the larvæ in the fish. After eating the infected fish they were fed wholly on dog biscuits to avoid any possibility of tapeworm infection from other sources. Two of the dogs were used for

physiological experiments and the gastrointestinal tract later removed for examination. I am much indebted to Dr. Moorhouse, Professor of Physiology, for his help and co-operation in the animal experiments.

Dog No. 1 would only nibble at scraps of the infected fish. I did not think he would be infected in this manner, so he was used in physiologic experiments nine days after the feeding. His ileum contained 1 *D. latum* with a typical head as illustrated in Fig. 7. The segments

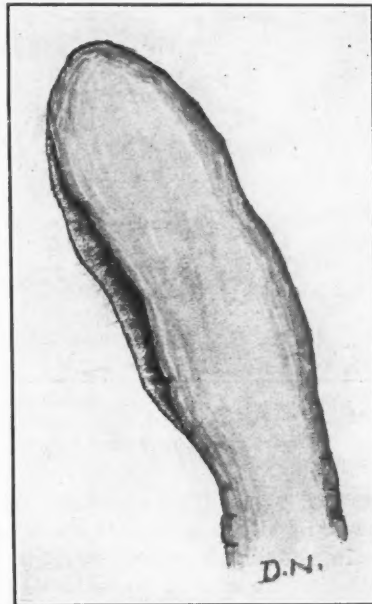


FIG. 7.—Typical head of fish tapeworm showing lateral slit (x30) from dog No. 1. The shape of the heads varies, especially where there are multiple parasites. Many are heart-shaped but all have the lateral grooves.

Many are heart-shaped but all have the lateral grooves. Many are of typical shape and a development of a central uterus was beginning in the end segments.

Dog No. 2 would gulp down large portions of the infected fish, so he was fed about a pound of infected slices of pike on three consecutive days. More than five weeks elapsed before ova appeared in the stool. This prolonged time was probably due to the large number of worms in

FEEDING EXPERIMENTS WITH THE LARVÆ (plerocercoids) FOUND IN THE PIKE (*Esox Lucius*) AND PICKEREL (*Stizostedion vitreum* MITCH.)

Dog	When Fed Larvæ	Variety and Origin of Fish	Date of Examination	Result
No. 1	Feb. 8	Pike, L. Winnipeg	Postmortem, Feb. 17	1 <i>D. latum</i> , 8 inches long.
No. 2	Feb. 8	Pike, L. Winnipeg	Postmortem, Mar. 29	19 <i>D. latum</i> , 18-40 inches long.
No. 3	Feb. 12	Pickerel, L. Winnipeg	Vermifuge, March 31	5 <i>D. latum</i> , 2 heads, 1½ to 2½ ft. long.
No. 4	Mar. 3	Pike, L. Manitoba	Vermifuge, April 7	8 <i>D. latum</i> , 6 heads, 2 to 3½ ft. long.



FIG. 9.—Coils of intestine containing strands of fish tapeworm. The arrows point to the position of the heads. The stomach and caecum may be seen below. Taken from dog No. 2.

the intestine. When many are present they do not grow as rapidly or as large as does a solitary worm. Post-mortem examination, seven weeks after infection, showed 19 heads in the ileum. The bodies of all these worms made a cord about half an inch in diameter. Fig. 9 shows the intestine containing the parasites. This dog showed many typical ova in his stools for the previous ten days.

Dog No. 3 was fed muscle of pickerel containing larvæ. Typical ova appeared in twenty days. They were present in great numbers, but no worm segments were passed. Blood examination showed no anæmia three weeks later. He was given a vermifuge forty-eight days after the feeding of the pickerel. Five tapeworm segments, two with heads attached, were passed. The heads had a groove on the side. The uterus consisted of a small rosette body near the centre, which would stamp it as a *D. latum*. See Fig. 8.

Dog No. 4 was fed on larvæ infected pike from Lake Manitoba. Four weeks later ova, typical of *D. latum* were found in his stool and a vermifuge the following week caused six whole worms



FIG. 8.—Segments of fish tapeworm (x5) cleared in methyl salicylate to show the central uterus. From dog No. 3.

and two without heads to be expelled. Microscopical examination of the heads and segments showed them to be typical *D. latum*.

PREVENTION OF HUMAN INFECTION

It is impossible to inspect and exclude infected fish for sale in the same manner as meats. The health authorities should warn the public by announcements about species of fish known to be infected. Freezing, smoking, dry cleaning, or pickling in salt does not destroy the parasite. If eaten, these fish should be thoroughly cooked. Five minutes at 65 degrees C. will kill the larvæ, and for ordinary cooking the temperature reaches 100 degrees for as long as ten minutes. A possibility of infection remains in some of the quick service restaurants where the cooking may not be sufficiently long to kill any deeply embedded larvæ.

While thorough cooking renders all fish safe, we do not like to eat fish containing larvæ any more than we like to eat measly meat. We should therefore devise means of breaking the life cycle of the *Diphyllbothrium latum* at some point.

I am indebted to Dr. Wm. Boyd, Professor of Pathology, for the many valuable suggestions he has given me in this work.

SUMMARY

1. Most valuable in the diagnosis of fish-tape-worm infection is it to find out about (a) The eating of fish likely to be infected; (b) Carelessness with regard to cooking; (c) The passing of segments by the bowel; (d) Examination for ova by a concentration method.

2. Anæmia may be slight or of the severe aplastic type. It only occurs in a small percentage of infected cases, and is usually associated with degeneration of segments, so that none may be passed, though many ova will be.

3. The infection is commonest in people who come from the Baltic provinces, especially Finland and Russia, where eating uncooked fish is a common habit. Among the Jews, only the women get the infection because they taste the fish in preparing it for cooking.

4. The Winnipeg General Hospital records show 5 cases in 1927; 10 cases in 1924-26. Many

diagnoses of tapeworm are made without stating the variety. Most tapeworm infections are treated out of hospital.

5. Seven out of thirty-five pike examined, from Lake Winnipeg and Lake Manitoba, were infected with fish-tapeworm larvæ, as shown by feeding the larvæ to dogs. Two out of seven pickerel were similarly infected. Examination of gold eye, sucker, tullibee, herring and white-fish revealed no larvæ in the flesh or viscera.

6. Thorough cooking of fish is the most important immediate means of preventing human infection.

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ANEURYSM DUE TO TUBERCULOSIS WITH THE REPORT OF A CASE OF TUBERCULOUS ANEURYSM OF THE RIGHT FEMORAL ARTERY*

By R. B. MALCOLM, M.S.C., M.D.,

Montreal

THE production of aneurysm of the large arteries by various infective processes has always been of interest to pathologists, and particularly those caused by the tubercle bacillus. Such aneurysms may arise either by direct extension from without, or from within, by involvement of the intima on the one hand, or by "mycotic embolic thrombosis" on the other.

Eppinger¹ states, "By a mycotic embolic thrombosis (i.e., in one of the vasa vasorum) there occurs an acute peri- and mesarteritis, leading to complete solution of continuity of the elastica and damage to the resistant remaining tissue (e.g., adventitia) to form an aneurysm." He insists upon the multiplicity of the lesions within a small radius as constituting the strongest evidence of its embolic or thrombotic origin.

As early as 1844, Rokitsky² noted the

relationship of a mycotic abscess to the production of an aneurysm caused by the bursting of an intraparietal abscess into the lumen of the aorta, but the first record of the production of an aneurysm through tuberculosis was by Kamen,³ who described in 1895 the case of a soldier, twenty-four years of age, who had chronic pulmonary tuberculosis and acute miliary tuberculosis; the former caused an aneurysm of the ascending portion of the aorta just above the aortic cusps, by direct extension from caseous mediastinal glands.

In 1896 Hannau and Sigg⁴ reported a case of an aneurysm of the thoracic aorta, arising in connection with a tuberculous lung cavity. The entire wall became replaced by tuberculous tissue. The cavity was filled with a caseating mass of thrombotic material. Tuberculosis, secondary to other degenerative changes in the aorta, and causing marked weakness of the wall, has been reported by Huchard and Mouget⁵ in 1904, by Nattan and Larrier⁶ in

* From the Surgical Service of Dr. E. M. Eberts and the Pathological Department of the Montreal General Hospital.

1899 and two similar cases are reported by d'Amblard⁷ in 1906 and 1905.

Pel¹⁰ of Amsterdam reported a case of a young girl, twenty years of age, who died from an aneurysm of the superior mesenteric and femoral arteries, undoubtedly of tuberculous origin. The autopsy showed tubercles to be present in the mitral valve. Pel considered that the vascular lesions in this case were due to tuberculous emboli from the mitral valve.

Tozer⁸ reported a tuberculous aneurysm of the abdominal aorta which ruptured into the duodenum. In the media, which was very much thinned out, the elastic tissue was replaced by fibrous tissue filled with lymphocytes. The intima showed tuberculous granulations with numerous giant cells.

In 1910, Ribbert demonstrated a specimen from a woman, forty-six years of age, who died of chronic pulmonary tuberculosis, in whom communication had been established between the lumen of the aorta and a cavity lying in a large tuberculous mass, which arose from the periosteum of the vertebrae. The outer layers of the aorta had been destroyed and replaced by tuberculous tissue, and the process had advanced until the rupture of the intima had occurred. A small oblique tear of the intima opened into a short canal which led from the aorta into the cavity. The cavity itself was nearly filled with caseous clot. As he pointed out, this was not a true aneurysm though the circulating blood passed in and out of the sac.

In 1913, Samuel R. Haythorn⁹ reported a case of "Tuberculous Aneurysm, involving the Right Common Iliac Artery." The patient was a male, aged thirty-three. The clinical diagnosis was general miliary tuberculosis; chronic pulmonary and right-sided renal tuberculosis; tuberculous enteritis; and aortic aneurysm. At necropsy an aneurysm of the right common iliac artery was found, measuring 7 cm. in length, 4 cm. in breadth and 3 cm. in thickness. Its wall appeared to be continuous with the common iliac above and with the internal iliac below. When the vessels were opened, the aneurysm was found to involve the common iliac only. The interior of the sac was almost filled with reddish-grey thrombotic material, which appeared caseous. Microscopically, the outer wall of the sac was found to be continuous with the adventitia of

the common iliac above and with that of the internal iliac below. The media and intima took no part in the enlargement. Great numbers of acid-fast bacilli were found diffusely distributed throughout the entire contents of the sac. Acid-fast bacilli were found in the glomerular capillaries of the kidneys, as were also many tubercles throughout the renal substance. Acid-fast bacilli were also found in the lungs. Tubercles were seen in the spleen and liver. Haythorn believed, in this case, that the tuberculous process spread directly to the adventitia of the right common iliac artery from some adjacent focus; that it so involved the media as to lead to rupture; that the pressure of the blood pouring through the opening separated the inner layers of the media from the outer layers and from the adventitia, thus producing a dissecting aneurysm; that the blood in the sac thus formed underwent coagulation, and became infected from the tuberculous adventitia, and thus served as a medium for the growth of the tubercle bacilli and as a source of constant supply of them to the blood.

In 1918, Lutembacher¹⁰ published two cases of aneurysm involving the auricular appendages of the heart, which were proved to be tuberculous. In 1921, Pistacchi¹⁰ reported a case of tuberculous granulomata of the aorta. In 1922, Apert and Bordet¹⁰ showed, before the Anatomical Society of Paris, a small aneurysm of the arch of the aorta in a case of tuberculous broncho-pneumonia. Search for bacilli in the sections was negative, but giant cells were found. The authors concluded that this lesion was due to tuberculosis. In 1922, Le Noble, who gives the previous references, himself reported a case of aneurysm of the first portion of the aorta, undoubtedly of tuberculous origin.

In 1925 W. A. Dafoe¹¹ reported two cases of ruptured aneurysm of the abdominal aorta, due to tuberculosis. In the first case he considered that the rupture of the aorta was due to the spreading of the tuberculous process to its adventitia and media from the attached tuberculous lymph-nodes. In the second case the tubercles in the organs were all of fairly recent origin. E. P. Brockman¹² reported a case of aneurysm of the femoral artery in a boy, fourteen years of age, with tuberculosis of the spine. Examination showed the presence of a diffuse pulsating mass in the region

of the femoral artery. A thrill was present and a systolic murmur was heard over the tumour. Pressure above caused diminution of the mass. By operation the aneurysm was removed. Areas of caseation were found. Giant cells were present in the wall, but no acid-fast bacilli were found.

In March, 1928, W. P. Thomson¹³ reported a case of aneurysm of the hepatic artery, apparently caused by invasion of the arterial wall from an adjacent tuberculous focus. This case was a male, aged forty-three, who had had a tuberculous infection of the pubic bone ten years previously. In November, 1926, he was admitted to the Johns Hopkins Hospital with clinical signs pointing to gall-bladder disease. Ten days later, operation showed a large œdematous gall bladder containing blood clot and blood-stained bile. No stones were present and the gall bladder was drained. Eighteen days after admission the patient died in coma. The necropsy showed an aneurysm of the hepatic artery. In the common duct there was a thrombus-like mass just above the entrance of the cystic duct. This mass surrounded a tear in the wall of the common duct, 2.5 cm. in length, though there was direct communication with a small aneurysm of a branch of the hepatic artery. Sections showed rupture of the wall of the artery surrounded by a tuberculous mass which contained scattered epithelial cells and giant cells. No tubercle bacilli were found.

REPORT OF CASE

Male; aged 72 years; admitted to the Montreal General Hospital on December 29, 1926.

Complaints.—Pain and swelling of the right thigh.

Personal History.—He had followed the sea most of his life, latterly as captain of a sailing vessel; had been exposed to all kinds of weather, but had had no serious illness. About three years ago he first noticed a lump in the left groin. This was an indirect inguinal hernia, for which he has since worn a truss continuously.

Present Illness.—The patient was first seen by the writer on December 15, 1926, at which time he complained of much pain in the region of the inner aspect of the right knee. Examination at that time revealed no evidence of any swelling of the knee or effusion into the joint.

This pain persisted for about five or six days, and was then followed by severe pain on the inner aspect of the thigh, a few inches below Poupart's ligament. The femoral artery was palpable over this mass, but did not seem to be involved in it.

He was admitted to the Montreal General Hospital on December 29, 1926. On admission the whole right leg was larger than the left, the most marked swelling being just below Poupart's ligament and in the upper third of the thigh. The circumference of the limb at the level of the great trochanter was 24 inches: left thigh, 17 inches; right calf, 15¾ inches; left, 14 inches; right ankle, 9¼ inches; left, 9 inches. The swelling was bounded above by Poupart's ligament, and below it shaded off gradually into the general contour of the thigh. On auscultation of the tumour, a to-and-fro murmur was heard just below the mid-portion of Poupart's ligament. The whole internal aspect of the thigh was ecchymotic in the upper third.

While in hospital the patient became dull and listless, seeming to lose his memory, and losing all realization of time and place. On January 6th there was an area of blowing breathing over the lower lobe of the left lung and many large rhonchi and fine moist râles were heard. The heart was not enlarged to percussion but was very difficult to hear; no murmur heard. The pulse was irregular and showed extra systoles. On January 7th signs of pneumonia developed over both lower lobes. On January 8th the patient died.

Laboratory findings were as follows: The Wassermann reaction was negative; red blood cells 3,440,000; white blood cells 9,000; hæmoglobin 70 per cent; the urine showed no albumen, and no casts; the blood urea nitrogen was 42 mgm.; creatinine 1.47; sugar 0.137.

The clinical diagnosis was aneurysm of the right femoral artery, and broncho-pneumonia.

A summary of the findings at autopsy is as follows: (A-27-11.) Pathological Diagnoses: ruptured femoral aneurysm (right) (tuberculous arteritis); hæmorrhage about right femoral artery; miliary tuberculosis of the lung, liver, spleen, pancreas, prostate and adrenals; multiple acute duodenal ulcers (four); chronic fibrous pleuritis; thrombosis of femoral vein and its tributaries below an

aneurysm of the right femoral; bronchopneumonia of the right and left lungs.

A swelling of the right thigh was found to be caused by free hæmorrhages into the soft tissues and muscles surrounding a ruptured aneurysm of the femoral artery. The aneurysmal dilatation of the femoral artery began 17 cm. from the bifurcation of the aorta. It was 6 cm. in length and fusiform in shape. The aorta and iliac and femoral arteries showed considerable atheroma, ulceration and calcification. The femoral vein was collapsed above

the aneurysm, but dilated and thrombosed below it. The whole tumour mass, which was oval-shaped, consisted of the femoral artery and vein, the saphenous vein and tributary branches, the psoas, the rectus femoris, the pectineus and the adductor longus, measured about 4 cm. in diameter and 20 cm. in length. The surrounding muscles were friable and necrotic, owing to the extensive infiltration with free blood and pressure upon their fibres. The fascia lata directed the free blood anteriorly and medially. The aneurysm was just proximal to the origin of the profunda femoris artery. The deep tributaries of the femoral



FIG. 1.—Drawing of gross specimen to show (a) Aneurysm; (b) Thrombosed femoral vein; (c) Extravasation of blood into surrounding tissue; (d) Orifice of aneurysm. Outline of bony structure shows anatomical relations.

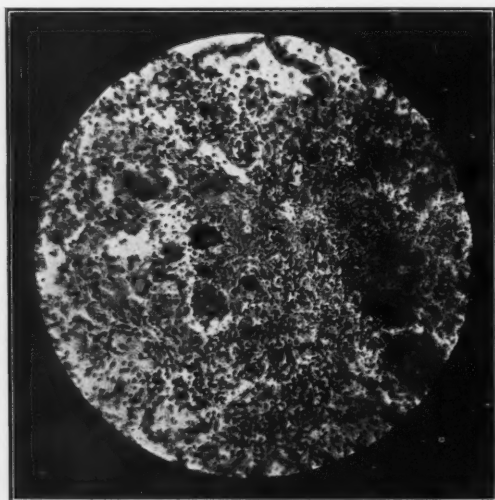


FIG. 2.—Section of lung showing the presence of giant cells.

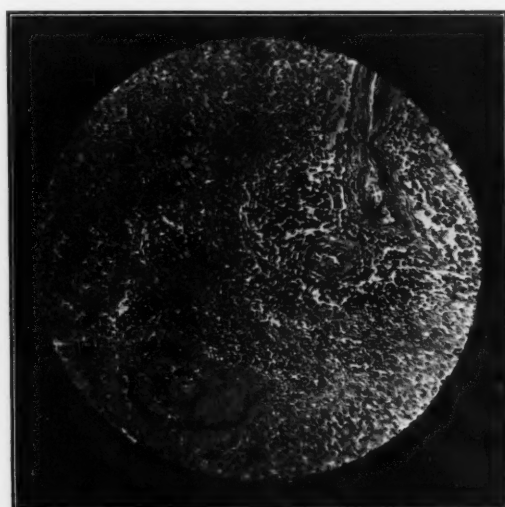


FIG. 3.—Section of spleen, showing large giant cell.

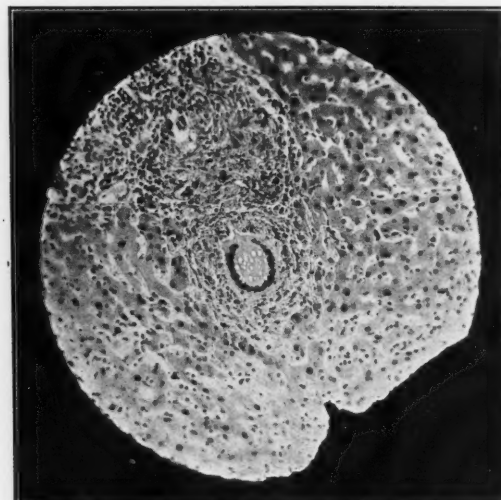


FIG. 4.—Section of liver, showing tuberculous area with large vacuolated giant cell.

vein which lie deep to the artery at this point were thrombosed. The femoral artery and vein were laid open. There was considerable atheroma and calcification of the femoral artery, and the aneurysm was found to communicate posteriorly and medially with the surrounding tissues. No communication could be traced with the femoral vein, which was occluded by pressure of the aneurysm and the surrounding infiltrated tissues and was thrombosed distal to the aneurysm. The escaped blood was held partly between the fibres of the

muscles themselves and partly by their fasciæ, which prevented it, anteriorly, from extravasating more freely into the subcutaneous tissues.

MICROSCOPICAL EXAMINATION

Heart.—Endocardium appeared normal.

Lungs.—The bronchi contained an inflammatory exudate and were surrounded by a thin zone of inflammatory cell infiltration. Some of them had beside them areas with giant cells and connective-tissue proliferation.

Giant cells were found in the spleen, liver,

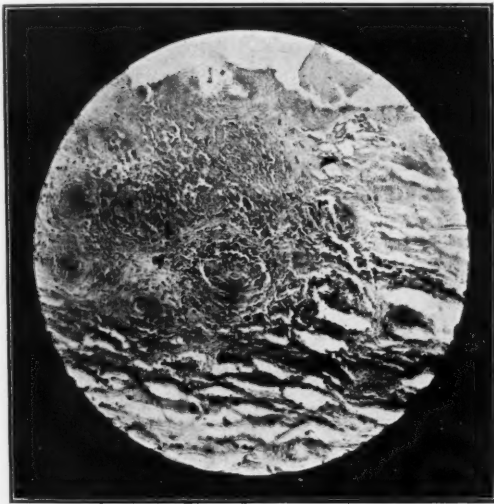


FIG. 5.—Section showing presence of caseous tuberculous area in media of vessel wall.



FIG. 7.—Section through media of vessel wall, stained for *B. tuberculosis*. Note the great number of organisms, singly and in clumps.



FIG. 6.—Section showing giant cell in media of vessel wall.

pancreas, adrenals, and prostate. None were found in the kidneys.

Report on the femoral aneurysm. "The vessels of the adventitia are engorged. There is extensive necrosis of all coats with slight fibrous connective-tissue proliferation. Giant cells observed. Suitable staining methods reveal the presence of many acid-fast bacilli in the media. These organisms conform to the size, shape and staining reactions of the tubercle bacillus."

SUMMARY

To date twenty cases of aneurysm due to tuberculosis have been reported. In only two of these has *B. tuberculosis* been isolated. In Haythorn's case *B. tuberculosis* was found in the caseous clot filling the aneurysmal sac. In the present case *B. tuberculosis* has been found in

the media of the arterial wall, showing the infection to have been due to transmission of the disease through the vasa vasorum.

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THE DEATH-ROLL OF APPENDICITIS DUE TO THE ABSENCE OF CLASSICAL SYMPTOMS*

BY HERBERT A. BRUCE, M.D., F.R.C.S. (ENG.),

Professor of Clinical Surgery, University of Toronto;

Consulting Surgeon, Toronto General Hospital

UNTIL within the last year or so I was under the impression that appendicitis was so well understood by the profession that further discussion of the subject before a medical gathering was unnecessary. I have had a rude awakening, due to meeting with far too many cases unrecognized at an early stage, when operation would have been safe and simple, but, left until grave complications had set in, making operation almost, if not quite, futile. The blame for this cannot always be placed upon the family physician, because often he has not been sent for until too late for early operation.¹ Dr. W. E. Gallie states that in 70 per cent of the cases admitted into the Children's Hospital, the appendices had already ruptured. In these cases the parents are almost entirely to blame, because as a rule they have given the child castor oil, and have not called the family doctor until the appendix had ruptured. In these days when the public is so well informed on medical subjects, it is becoming increasingly difficult to explain to them why their loved one was not operated upon at an earlier date, when recovery could have been expected, unless it is pointed out that the cause rests with themselves.

Before entering upon the subject proper of the paper, I should like to make a few further

remarks. It seems hardly credible that only so recently as to be within the professional memory of many of us here, the various pathological phenomena in the right iliac fossa have been shown to have their origin in the vermiform appendix.

Celsus,² who lived in the early part of the first century of our era, speaks of the "iliac and colic passion," which terms were used until well toward the end of the eighteenth century, to describe a condition which we now know to have been due to appendicitis. Peter³ Lowe, writing in 1612, gives the interesting information, on the authority of Lonicerus, that "Hippocrates did die of this disease."

Krönlein⁴ appears to have been the first to remove an appendix for acute disease in 1884. In 1887 Sands⁵ successfully closed a perforation of the appendix by suture, while in 1888 Treves⁶ did a laparotomy for relapsing typhlitis, and found the omentum adherent to the appendix, which was thus kinked. Treves therefore cut the adhesion, sutured a tear in the peritoneum, bared the convex surface of the appendix of its peritoneal coat, thinking it would thus contract new adhesions with the parietal peritoneum on its outer side, and so be held straight, and closed the abdominal wound, leaving the appendix in its new position. Recovery ensued, but how fantastic the procedure seems to us to-day. Being en-

* Read before the Academy of Medicine, Toronto, November 15, 1927.

couraged by his experiences, he next removed the appendix for recurrent attacks, which was the first time that the operation was performed in the interval.

In 1886 Reginald H. Fitz⁷ pointed out that in 209 cases of typhlitis or perityphlitis, the symptoms were identical with those observed in 257 cases of perforation of the appendix, which helped to convince the medical world that practically all inflammations in the right iliac region are due to appendicitis. McBurney,⁸ in 1890, described the area of tenderness which bears his name. In the same year Nicholas Senn⁹ pointed out that affections of the appendix were bacterial in origin.

During my year as house surgeon in the old Toronto General Hospital, 1892-1893, I can only remember one case of appendicitis being operated upon and then it was considered such an unusual and important event that the entire surgical staff was present, three senior surgeons actually taking part in the operation. At this period we were still constantly hearing cases described as typhlitis and perityphlitis. In the main, leeches were used to combat the disease, or when the disease had thoroughly "ripened" by linseed poulticing, the abscess either opened spontaneously or the skin was incised to let out the pus. From 1894-1897, while attending the London hospitals, I saw but few cases of appendicitis operated upon.

Many years were spent in discussion as to whether appendicitis was a medical or a surgical disease. Then, when it became definitely recognized as a surgical disease, there was a prolonged period of discussion as to the proper time at which to operate. Ultimately this was settled, and now all surgeons are in agreement that the best time to operate is as soon as possible after the beginning of an acute attack, the earlier the better. If done within the first twelve or twenty-four hours, the mortality will be little greater than in the case of an interval operation. May I here express my strong conviction that, if in doubt about the diagnosis, but with reasonable cause for believing that it is a case of acute appendicitis, then give the patient the benefit of the doubt by having the appendix removed. I am sure the risk of the operation is much less than the risk of allowing the disease to progress. Better to remove a dozen appendices not diseased than

to leave one which will progress to diffuse peritonitis.

I should like now to report three or four typical cases.

CASE 1

A boy, G. W., aged ten, was taken ill on Christmas night with slight mid-gastric pain and vomiting, but thought by his physician to be due to over-eating. He had *no rigidity*. He was somewhat better the next day and had a *normal temperature* and normal pulse rate. On the third day the pain and vomiting returned and continued for forty-eight hours, when his temperature reached 104°, with a pulse rate of 140, but still *no rigidity*. The leukocyte count was 12,000; 88 per cent polymorphonuclears. I then saw that patient for the first time, that is five days after the beginning of the attack, and although there was *no rigidity* to be made out, there was slight tenderness on pressure, and I diagnosed diffuse septic peritonitis, due to a ruptured appendix, which was confirmed at operation and found to be of streptococcal origin. He developed cellulitis of the anterior abdominal wall, a subphrenic abscess, and empyema of the right pleural cavity. Although prompt measures were taken to deal with these complications, he finally succumbed.

CASE 2

Mr. S. P., aged 58. He was taken ill with indefinite pain in the abdomen, *but no vomiting*. He had a cough and some râles at the base of his lungs. During the next two days he had pain in the abdomen and distension, but *no special rigidity*, and his physician diagnosed it as influenza and attributed the pain in his abdomen to pleurisy. When I saw him on the evening of the fourth day of his illness, his pulse was 124, his temperature 100°, and the abdomen was greatly distended and of board-like hardness. A diagnosis of diffuse peritonitis, due to a perforated gangrenous appendix was made, and the physician and friends told that an operation offered such a very slight chance that I did not advise it. However, I ultimately yielded to their pleadings that he be given a chance, even though it was only one in a thousand. At the operation the peritoneal cavity was found filled with foul-smelling pus, the intestines were glued together and deep red in colour and the appendix was gangrenous. He died two days later of septicæmia and obstruction.

CASE 3

A girl, H. O., aged nine, taken ill in the evening with pain in the abdomen and vomiting. The physician who was called could find *no rigidity*, and, as the temperature and pulse were both normal, attributed the condition to something she had eaten. As she vomited all the next day, and in the evening her temperature went up to 100°, with a pulse of 100, she was brought into the hospital, where I saw her. The leukocyte count was then 18,000, with 92 per cent polymorphonuclears. There was still *no rigidity*, but a diagnosis of diffuse peritonitis was made. At the operation the appendix was found lying in the pelvis, with pus throughout the abdomen, of pneumococcal origin. The patient developed intestinal obstruction, acute dilatation of the stomach, and ultimately died of septic pneumonia.

I could go on repeating such cases in considerable numbers, but think these are enough to indicate the obvious lesson to which they point. I should like, however, to refer briefly to another case which does not strictly belong

to the title of the paper, but which furnishes an excellent warning to the public.

CASE 4

J. C., aged 8, was taken ill with pain in the abdomen and vomiting, the illness continuing for three days without improvement, during which time he was treated by his mother with castor oil and enemata, she thinking that the trouble was due to something he had eaten. The boy himself asked his mother to call a doctor on the third morning, when the latter sent him into the hospital and I operated immediately upon admission and found a ruptured gangrenous appendix, with diffuse peritonitis, due to the streptococcus. He developed intestinal obstruction, acute dilatation of the stomach, and died on the third day.

This case adds another to the long list of fatalities due to castor oil, and makes it more incumbent upon us to devise some more effective method of warning the public of the danger of giving castor oil to children who have abdominal pain. Years ago in papers upon this subject, I called attention to the danger of attributing any abdominal pain to an error in diet and made the statement that I had never seen a case of "acute indigestion" which was a popular term for even medical men to apply to grave abdominal disasters, such as acute appendicitis, perforation of the stomach, etc. Further years of experience have not caused me to change my opinion, but only to confirm it. Every other avenue should be thoroughly explored as a possible cause of the trouble before falling back upon a "symptom," which so-called acute indigestion usually is, and exalting it into the importance of a disease.

The delay in calling a surgeon has often been explained as due to the fact that the patient was afraid of an operation and wanted everything else tried first. It seems to me that if physicians would only acquire the habit of calling surgeons in at the outset of an acute abdominal condition, to help them make a diagnosis, a great step in advance would be made and many lives would be saved. Let the patient and friends know that the surgeon is not being called necessarily for the purpose of performing an operation, but simply because he is the best qualified man to make a diagnosis. Many times he would not operate, but he would have the opportunity of seeing surgical diseases at a much earlier stage, when the patient's chances of recovery by operation would be infinitely greater. I have no hesitation in expressing the opinion that a surgeon

with a large experience in abdominal work is much more competent to make a diagnosis in an abdominal case than is a physician, and that he should therefore largely replace the latter in consulting work in abdominal cases. The attending physician assumes a grave responsibility when he sees a patient at the onset of an acute abdominal disease, as it is upon his diagnostic acumen that the fate of that individual often depends. If he is a wise man he will ask a surgeon at once to share that responsibility with him.

Parents and relatives are only too ready to find something unusual in a "meal" to explain the illness, and it behoves the physician not to fall into this trap, but to exhaust every possible investigation at his disposal to make a diagnosis, always remembering that "an error in diet" is the least likely cause of the symptoms.

The absence of classical symptoms is sometimes due to the appendix occupying an unusual position, for example, below the brim of the pelvis, attached to the bladder, on the left side, or a retro-caecal one. In children there is sometimes no rigidity.

The diagnosis of acute forms of appendicitis usually presents little difficulty. The sequence of the symptoms is most important; first pain, then vomiting, then tenderness over the appendix, later rigidity, and finally fever. Of these classical symptoms, the presence of fever is the least important. Vomiting may not have occurred, but if not, there will usually be nausea or a disinclination for food. Tenderness, accompanied by rigidity, is the most constant and reliable sign of the disease. However, in the case of children rigidity is frequently absent, which makes diagnosis often difficult. A leucocytosis of 14,000 or 15,000, with a high polymorphonuclear count of 80 per cent, or more, usually means that the disease has advanced to suppuration, or at least to a very acute stage. At the outset, there is no means of telling whether the attack will be mild and subside spontaneously, or whether it will proceed to abscess formation or diffuse peritonitis. Under these circumstances, the only safe position to take is to advise immediate operation, unless there be some complication which would make operation hazardous.

In the treatment of paresis of the bowel,

there are two agents of great value, namely, the administration of saline intravenously, and the use of the stomach and duodenal tubes. In these cases I have had excellent results following the administration of 30 c.c. of 30 per cent solution of sodium chloride intravenously. This can be repeated if necessary, several times.

The surgical staff of the Sick Children's Hospital, Toronto, have devised an ingenious apparatus for the intravenous administration of salt solution, either isotonic or hypertonic. The apparatus used consists of a burette connected by a short piece of rubber tubing to a perforated rubber stopper. In the lower end of this is an adapter which is commonly used on a 30 c.c. syringe. The rubber stopper feeds into the barrel of a 20 c.c. record syringe. Attached to the lower part of this is a rubber tube connected with a gold needle which is placed in the vein. A very simple dressing keeps the needle in place and the rate of flow is regulated by a pinch-cock above the syringe. The ordinary Murphy drip as used by Matas¹⁰ was found to fill up under too little pressure and discontinue the flow. In a small percentage of cases thrombosis of the vein complicates this procedure. This method serves two purposes, it supplies the patient with fluid and also replaces his diminishing chlorides. Glucose can be added.

The second agent, repeated lavage of the stomach, is a life-saver. In many cases, to spare the patient the discomfort of passing the larger tube, he is induced to swallow a duodenal tube, the upper end of which is fastened to his cheek. Through this, one can withdraw the contents of the upper intestine and administer fluids. This can be left *in situ* for many days without causing the patient any discomfort. A word of caution in regard to its prolonged use is indicated, as one must make sure that the patient is receiving a sufficient supply of sodium chloride. I have seen two cases of tetany develop while using a duodenal tube, which I thought were due to depletion of chlorides, through removal of the gastric juices. The cases recovered after the removal of the duodenal tube.

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Diphyllobothrium Latum in Massachusetts.—E. G. McGavran and M. Songkla, Boston, report two indigenous cases in Massachusetts. The first patient, a boy, aged 3 years 2 months, of native Russian Jewish parentage, began to pass "white strips" about five months before admission which were identified by the family physician as "tapeworms." The diagnosis of *Diphyllobothrium latum* was made later on the finding of numerous typical eggs in a simple smear examination. Further questioning elicited the fact that the patient was very fond of fish and had been caught stealing and eating bits of raw fish while his mother prepared a meal. Physical examination was essentially negative. The other patient, a girl, aged 4 years 2 months, was born in Greater Boston and had lived in Chelsea, Mass., all her life. The father was born in Russia, the mother in Boston; both were of Jewish parentage. The patient passed a 20-foot long yellowish white, ribbon-like worm. No head was found. There were no symptoms, and the patient was well all the time. The worm was diagnosed as *Diphyllobothrium latum*, but the specimen unfortunately was not preserved. On the next visit, eggs of the same organism and segments were found and were identified as *D. latum*. Further history revealed that the family

had fish twice a week, usually fried and occasionally as fish balls. The mother did not remember that the patient had her meals anywhere except at home. She had noticed that the patient was in the habit of picking up and putting into her mouth bits of raw hamburger steak while she cooked the family meal. She had not observed the child picking up any raw fish but would not exclude the possibility. Physical examination showed that the child was very well developed and well nourished and entirely normal. Inquiries made at fish markets showed that the chief wholesale supply of fresh water fish comes from the Great Lakes region and the Ohio river. Therefore, the fresh-water fish apparently responsible are either white fish, *Coregonus clupeaformis*; lake herrings, *Leucichthys*; carp suckers, *Carpoides thompsoni*; suckers, *Catostomus commersoni*; the common pike, *Esox lucius*, and the yellow perch, *Perca flavescens*, all of which are shipped in large quantities out of the Great Lakes region to eastern markets. Because the sewage of so many towns empties directly into the Great Lakes or other bodies of fresh water, the fish of these regions have every opportunity of becoming infected and must be considered as the probable source of infection.—*J. Am. M. Ass.*, May 19, 1928, 1607.

VERTIGO OF UNKNOWN ORIGIN, OCCURRING AS A MILD EPIDEMIC

By C. B. Ross, B.A., M.D., C.M.,

Sanitarium, Ont.

IN the wards of the Muskoka Hospital for Consumptives have been observed several cases which present evidence of functional disturbance of the vestibular portion of the eighth nerve or of the labyrinth, without the accompanying auditory symptoms usually found in Menière's disease.

Among the symptoms present, vertigo plays the most prominent part. This is usually severe, especially when the patient is moving and in the upright position. It may be so intense as to cause the patient to stagger in walking, or even to collapse. Even in the recumbent position the vertigo may be very marked, especially on lateral rotation of the head. When the patient lies on his back, the head is frequently held rigidly in one position, usually facing directly anteriorly or slightly to one side, and the information will be volunteered that movement of the head laterally brings on a wave of giddy sickness.

Nausea is always present to some degree, and usually vomiting. Both these symptoms vary considerably in intensity. They appear after the onset of the giddiness, are apparently secondary to it, and disappear before that symptom is entirely gone. When first seen, the nausea and vomiting may be so severe as to make the observer suspect an abdominal catastrophe. Usually, however, the patient gives of his own accord a description of the giddiness, which will always be found to have preceded the gastric symptoms.

Severe headache is usually absent. Sometimes, on being questioned, the patient will state that headache is present, but the usual complaint is of a vague distress, a "heavy" or "dull" sensation behind one or both ears, usually worse on one side. When present, this sensation is most frequently on the side on which, on turning the head, the vertigo is most markedly increased.

Nystagmus is present in most cases and it is variable in type and degree.

Auditory disturbances are never observed.

One patient showed a scarred and retracted ear-drum from a recently incised and healed acute otitis media. Two others gave signs of a mild chronic catarrhal condition of the middle ear. In none of the cases were auditory disturbances found, nor any evidence which would suggest the presence of an active infective process of the middle ear.

A slight range of fever occurred in only three of the cases, lasting two or three days at the most, and only in one did it rise to more than 100 degrees.

The syndrome was first observed in a young man who was suffering from minimal pulmonary tuberculosis, complicated by spinal caries and psoas abscess. Tuberculous meningitis was first suspected, for, though the onset was not typical of this fatal complication, it frequently happens that tuberculous meningitis does not follow in its inception the classical text-book picture. The further evolution of the syndrome, however, satisfactorily ruled out the possibility of tuberculous cephalic or meningeal disease. The majority of the afflicted patients were those who were closely confined to bed because of complications, or because of the advanced extent or activity of their pulmonary lesions. It was thought at first that this constant recumbency might have been a congestive factor in the etiology of the disturbance, but in the last cases to come under observation this possibility seems rather remote.

One might suggest the possibility of the symptoms being due to a toxic neuritis, of a tuberculous nature, of the vestibular portion of the eighth nerve, or to a toxic inflammation of its highly specialized appendage. However, previous experience with tuberculosis has not shown similar cases.

The phenomena roughly shape themselves into a form which suggests an inflammatory disease of infectious origin which, so far as can be found, has not previously been classified. The thought occurred that the appearance of

the syndrome might be part of a mild contagion, protean in its symptomatology, and manifesting itself in other cases in a less characteristic way. But a fairly careful examination of the other patients and residents for local neuritis, myalgia, or general symptoms of obscure infection, has failed to reveal any corresponding increase in the occurrence of these.

The cases on record at the Muskoka Hospital are listed as follows:—

CASE 1

H. R., male, aged 22. Minimal pulmonary tuberculosis; spinal tuberculosis with psoas abscess; immobilized on a Whitman spinal frame.

July 23, 1925, vertigo commenced suddenly and severely, with nausea and severe vomiting. The least movement of the head laterally from the dorsal position served to precipitate an attack of dizziness, nausea and retching. Movements of the head to the left caused more disturbance than to the right. A vague distress was complained of behind the left ear. There was a moderate degree of lateral nystagmus. The condition remained severe for three days and then gradually disappeared; the gastric symptoms disappeared first, and slight dizziness remained until about ten days after the onset. There was no fever at any time. There were no auditory disturbances nor abnormal findings in the ears. There have been no recurrences. Present condition: well and working.

CASE 2

R. M., female, aged 32. Minimal pulmonary tuberculosis.

January 17, 1927, vertigo commenced suddenly. She staggered and almost collapsed on attempting to walk. Nausea and vomiting were severe, the latter lasting for four days, and the nausea slightly longer. There was severe headache in the vertical region, and a sense of fullness behind the right ear. Attacks of vertigo were precipitated on lateral rotation of the head, particularly to the right. Twelve days after the onset there was still some dizziness, without nausea or vomiting. At this time there was a slight degree of past-pointing; nystagmus, rotary in type, looking to right and left, was present but not marked; and the patient could walk on a straight line. Both eardrums were normal and there were no auditory disturbances. There have been no recurrences. Present condition: well and working.

CASE 3

M. M., female, aged 41. Advanced pulmonary tuberculosis; intestinal tuberculosis.

February 7, 1927, developed a moderate amount of dizziness, worse on turning head laterally, particularly to right. She was nauseated and vomited. There was no vomiting after the first day, but the dizziness and, to a lesser extent, the nausea, persisted for six days and recurred occasionally for another ten days. Lateral nystagmus was present and fairly well marked. There was no pain nor distress in the head other than the vertigo. There were no auditory symptoms and the ears were normal. There was a rise of fever to 100 degrees from a previous range of slightly above 99 degrees, which persisted with daily remissions for five days, but such exacerbations of temperature were not unusual in this patient. She died from tuberculosis, August 6, 1927.

CASE 4

M. M., female, aged 39. Advanced pulmonary tuberculosis.

May 19, 1927, she became dizzy on turning the head to either side, particularly to the right. She was nauseated and vomited several times during the day. Nausea and vertigo persisted with diminishing intensity for about a week. Nystagmus was present during the first three days to a moderate degree (lateral type). There was headache and a vague distress behind the right ear. At no time was fever present. There have been no recurrences. Present condition: tuberculosis, unimproved.

CASE 5

D. C., male, aged 29. Moderately advanced pulmonary tuberculosis; tuberculosis of spine and epididymis; is wearing a spinal brace after having been successfully treated by immobilization on a Whitman spinal frame.

On August 6, 1927, he became dizzy and nauseated and vomited two or three times. Lateral rotation of the head brought on the dizziness. There was lateral nystagmus on turning the eyes either way. There was no headache, nor other distress in the head, save the vertigo which gradually disappeared in about one week. There was no rise of temperature. Two months later, October 5, 1927, he had a similar attack, disappearing gradually in about two weeks; and five months later, March 5, 1928, the symptoms reappeared, less severely for three days. There have been no auditory disturbances; both ear-drums appear to be somewhat retracted with loss of lustre. Present condition: tuberculosis, pulmonary disease and tuberculous complications are quiescent.

CASE 6

E. C., female, aged 17. Minimal pulmonary tuberculosis.

On September 28, 1927, she was seized suddenly with vertigo, nausea and severe vomiting. The latter disappeared in twenty-four hours, but slight nausea and considerable vertigo persisted for two more days. The patient staggered on attempting to walk the first day. The dizziness was brought on by lateral rotation of the head, most marked to the left. Nystagmus was not noticed. All symptoms disappeared within four days. One month previous to the attack the patient had complained of an intense pain behind the right ear, involving the pinna, the mastoid area, and part of the lateral scalp, which from its nature and distribution was considered to be a neuritis. This has recurred once, four months after the attack of vertigo. There were no auditory symptoms. The patient had a history of a right-sided otitis media some weeks before, but examination showed a slightly retracted drum with the incision well healed and the ear was otherwise apparently normal. The temperature was slightly elevated for four days. There have been no recurrences of vertigo. Present condition: tuberculosis improved.

CASE 7

I. R., female, aged 22. Moderately advanced pulmonary tuberculosis; tuberculosis of the right sacroiliac joint with abscess; simple goitre; immobilized in a plaster cast.

October 17, 1927, was seized suddenly with vertigo, followed by nausea and vomiting. Lateral rotation of the head precipitated the attacks, particularly on turning to the right. There was no pain in the head, but a sense of dullness behind the right ear was described. She vomited frequently for two days, and the vertigo and, to a lesser extent, the nausea, persisted for nine or ten days. Nystagmus was moderate and inconstant. There was no fever at any time. Both ear-drums were

normal in appearance and there were no auditory disturbances. There have been occasional recurrences of slight vertigo on turning the head to the right, but these have never lasted more than one day, and have been without any noticeable etiological factor. Present condition: sacro-iliac disease considered well healed; pulmonary disease, apparently arrested.

CASE 8

A. F., female, aged 30. Advanced pulmonary tuberculosis; right-sided hydrothorax, following spontaneous pneumothorax; tuberculosis of the right sacro-iliac joint; immobilized on a Whitman spinal frame.

October 23, 1927, was seized with severe dizziness and headache. The vertigo was induced by turning the head either to right or left, but particularly to the right. There was slight nausea but no vomiting. A vague distress behind the right ear was described. The dizziness was marked for four or five days, and there have been frequent recurrences. There was a slight degree of past-pointing. Nystagmus was inconstant, usually most marked on turning the eyes to the right with the rapid phase to the left. There were no auditory disturbances. The right drum was retracted with other evidence of a mild chronic catarrhal condition. There was no fever. Present condition: tuberculosis generally improved; still having occasional recurrence of vertigo.

CASE 9

R. A., female, aged 24. Minimal pulmonary tuberculosis.

On March 3, 1928, vertigo commenced, followed by nausea and vomiting. She staggered when she walked and almost collapsed. The vomiting was particularly severe on the second day and diminished in intensity on the third. Vertigo and nausea persisted, the former to some degree for nine days. Nystagmus was not sufficiently marked to be recorded. There was no fever throughout the attack, and there have been no recurrences. Present condition; tuberculosis, improved.

To this list may be added the non-recorded occurrence of similar phenomena in three members of the professional or employees' staff

of the hospital. One of these ran a highly febrile course for several days with generalized neuritic symptoms. Another has had recurrences, diminishing in intensity, for three or four months.

M. M. Fisher, of Gravenhurst, reports one case of severe and unaccountable vertigo, with recurrences over a period of three months.

D. W. Crombie, of the Calydor Sanatorium, has observed similar phenomena in five or six of his patients, in some of whom recurrences were particularly outstanding.

As regards treatment, the severe symptoms seem to be partially controlled by bromides, luminal or atropine.

CONCLUSIONS

1. Several cases of vertigo of unknown origin are reported.
2. In none of these cases were there present any of the auditory disturbances usually found in Menière's disease.
3. Definite disease of the middle ear occurred so infrequently as to be considered a negligible factor in the etiology of the disturbance.
4. The occurrence of the phenomena in so many cases suggests an infectious and contagious character.
5. The frequency of recurrences denotes that the lesion is of inflammatory nature, and that complete resolution sometimes takes place slowly.

MIMICRY OF THE ACUTE ABDOMEN IN CASES OF CYCLIC VOMITING IN CHILDREN, WITH REPORT OF A CASE

BY THOMAS GIBSON, M.B., C.M., (EDIN.), AND JOHN MANN, M.D., C.M.,

Kingston General Hospital, Kingston

DURING the years 1923 and 1924 I observed in general practice several cases where the symptom-complex of acute appendicitis was closely simulated in the course of severe attacks of cyclical vomiting. In one of these, where I was in doubt whether appendicitis might be present as well as the recurring disease, I noticed that immediately after the child had vomited he at once relaxed, stretched out his legs, and rolled over on his side. On palpating, forthwith, over the right iliac fossa the rigidity

and tenderness one had observed were almost gone. This seemed to settle the point, as such a dramatic change could hardly have occurred in the presence of acute inflammation of the appendix. The same symptoms recurred in the course of the same child's next attack, and here I used emesis, which followed the drinking of two tumblers of water, to solve the problem once again. The same result, *viz.*, practically complete disappearance of rigidity and tenderness followed the vomiting. In spite of this experi-

ence, the parents consented some months later to the performance of an operation, advised by another practitioner, during a subsequent attack. This was quickly followed by death.

During the following winter an experienced pædiatrist advised in consultation immediate operation in a very severe case of cyclic vomiting, but on witnessing the result of emesis, produced as before by the drinking of half a pint of cold water, he revised his opinion, and the child recovered from the critical phase of his illness under the use of intra-peritoneal alkaline glucose injections.

The case report which follows illustrates the symptom-complex noted above and the wisdom of remembering that one may make a serious or fatal error in hurrying on an operation in the presence of a severe condition of acidosis, which may itself be a sufficient explanation of the symptoms present. In the case of B. M., described below, the attack of cyclic vomiting was beginning to break up by the time he reached hospital, because the vomiting phase was nearly over and the local signs suggestive of acute appendicitis had simultaneously become much less significant.

I have been in the habit of referring to my experience in these cases in the course of therapeutic talks during the past four sessions. Dr. Mann tells me that the remembrance of these case histories at once came into his mind when B. M. arrived in hospital, so that the urine tests for acid bodies and a blood count were at once made. Both were against operation, by pointing, the one towards acidosis, and the other away from any condition accompanied by septic absorption. The use of experimental emesis was not called for here, the case having developed favourably beyond its earlier acuter phase. The signs suggestive of acute appendicitis and the stomach symptoms disappeared together.

The history tends to confirm a belief in the common occurrence of the interrelation suggested in this note, between the severe stomach

disturbance and the symptom-complex which might suggest the acute abdomen, especially in the form of acute appendicitis, in cases of cyclic vomiting.

Up to the present I have not met with any reference to the use of emesis as a means of immediate bedside diagnosis in such cases, though it is quite probable that others may have used the same manœuvre. Consequently it seemed worth while to record these observations, in order that the test may be fully put to the proof.

B. M., a boy aged five years, was sent to the Kingston General Hospital on the night of April 14, 1928, with the diagnosis of acute appendicitis requiring early operation.

On admission, the child was slightly stuporous. He complained of abdominal pain and headache. The temperature was 101°F. (rectal); pulse, 100; respirations, 22; leucocyte count was 7,300 per c.mm. He was not vomiting, but had vomited a good deal during the afternoon before admission. He had been in perfect health until March 13th, when he had an attack of vomiting and headache. Both symptoms cleared up without treatment, and the child seemed quite well for a month.

The onset of the present attack, on April 13, was characterized by vomiting, headache, and severe abdominal pain, more marked in the right iliac region. An acute appendicitis was suspected, and the mother was advised to bring the boy to hospital.

The examination on admission revealed a perfectly soft abdomen, with no suggestion of splinting anywhere. Tenderness was not marked and the child withstood deep pressure with very little complaint. The abdomen was not distended. Examination of the chest revealed nothing abnormal.

With these negative findings, and the history of an attack of vomiting a month previously, cyclic vomiting was suspected. There was a faint odour of acetone on the child's breath. Urinalysis demonstrated the presence of acetone and diacetic acid, but was negative for sugar.

It was then fairly clear that the child had an acidosis in association with cyclic vomiting. Treatment for acidosis was started immediately. Glucose (5 per cent) with bicarbonate of soda (5 per cent) were given by the Murphy drip. The child was encouraged to drink orange juice, which he vomited at first, but after 250 c.c. of fluid had been given by the bowel he drank freely of orange juice and the vomiting ceased. Large amounts of fluid were then given by mouth without any trouble and the Murphy drip was discontinued. On April 15 there was only a trace of acetone and diacetic acid in the urine, and on April 16 they had disappeared. The child's condition steadily improved. By April 15 also his headache and abdominal pain had disappeared. The pulse and temperature were normal, and on April 16 he was playing with other children in the ward.

For permission to report this case we are indebted to Dr. I. G. Bogart, to whom the case was sent.

The double red cross, the internationally adopted emblem of anti-tuberculous societies, was used first by certain oriental Christian sects about the ninth century. During the Crusades, Godfrey of Bouillon, duc de

Lorraine, placed it on his standard when he took possession of Jerusalem in 1099. On his return to France it became the emblem of the House of Lorraine.

NEPHROSIS IN CHILDREN*

BY GLADYS L. BOYD, M.D.,

Toronto

I. NATURE, ETIOLOGY AND PATHOLOGY

THE word "nephrosis" was introduced into medical terminology by Müller¹ in 1905, and has since gained widespread popularity, chiefly through the studies of Volhard and Fahr,² in Germany, and Epstein³ on this continent. Briefly, nephrosis may be defined as a disease characterized clinically by marked œdema and intense albuminuria and the absence of gross hæmaturia, nitrogen retention, or persistent high blood pressure. Pathologically-speaking, the predominating changes in the kidney are degenerative in nature, and primarily limited in the main to the tubular epithelium. All those cases described in an earlier paper⁴ as acute tubular or hydræmic nephritis, as well as chronic cases of the same type, may be properly called nephroses.

The nature of nephrosis, whether primarily renal or only secondarily so, remains an unsettled question. Epstein⁵ considers it a metabolic disorder which leads primarily to albuminuria and secondarily to renal changes. Experimental, pathological, and clinical evidence all lend support to the theory that the kidney changes, while more or less characteristic, are secondary to some general toxæmic or metabolic disorder.

In kidney-extirpation experiments on animals, œdema has not been produced by the operation, except in the case of amphibian embryos. The injection of nephrotoxic chemicals, such as mercury and uranium, which show a predilection for tubular epithelium, has not produced hydræmia, unless fluids were forcibly administered thereafter. Recently, Hartmann⁶ and his co-workers have succeeded in producing the disease in cats by extirpation of their adrenals. Fahr⁷ suggests that the disease is due to changes in the reticuloendothelial system, and points out

the difficulties, in view of the experimental evidence, in considering the kidney as responsible for the production of the œdema.

Pathological data support the theory of the systemic nature of nephrosis in two ways. First, while the essential pathological changes usually described are in the kidney, fatty and degenerative lesions are found in other organs; and, secondly, degenerative changes of the tubular epithelium are present in chronic interstitial nephritis, but are not necessarily associated with œdema in such cases.

An initial toxæmia is indicated clinically by the frequent development of severe secondary anæmia and vague symptoms of ill-health, often months before the œdema is noticeable, and by the greatly increased susceptibility to infection shown by these patients throughout their illness. Further, when the disease becomes established many patients have a lowered metabolic rate, as demonstrated by Aub, Du Bois and Soderstrom.⁸

The etiology of nephrosis is nearly as obscure as its true nature. No acute infection ushers in most cases, as in acute glomerular nephritis, and the removal of obvious foci of infection has not usually produced any striking alleviation of the symptoms. Frequent head-colds, attacks of bronchitis, or, in infants, gastrointestinal upsets often precede the development of hydræmia. Of the infectious diseases, measles is apparently the most important. Ninety-five per cent of our cases had had measles, and in some symptoms of ill-health dated from the attack. Tuberculosis is another frequent infection in these cases, possibly due merely to their ready susceptibility to infection and not of any etiological importance. Volhard⁹ found 60 per cent of his cases thus infected. Forty per cent of our cases had positive intracutaneous tuberculin tests.

Marriott,¹⁰ and Clausen¹¹ have studied sinusitis as an etiological factor in nephrosis. They consider it an important cause. The most frequent infecting organisms obtained by them in

* From the Laboratories of the Sub-Department of Pediatrics, University of Toronto and the Hospital for Sick Children, Toronto, and the wards of the Hospital for Sick Children under direction of Alan Brown, M.B.

such cases were *staphylococcus aureus* and *albus*. In our earlier cases, such infections may readily have been missed, because no adequate search for them was made. During the past year and a half, five cases have been thoroughly investigated and evidence of sinusitis found in only two. Antral lavage in these cases yielded a turbid fluid, which when cultured proved to be sterile. Clinical improvement in both cases was marked, but was only temporary. Further, since more careful search has been made for sinusitis, it has been found as often in other types of nephritis as in this.

Cultures of the blood, urine, and diseased tonsils have been disappointingly negative in most cases we have studied. Blood cultures were positive only when septicæmia supervened, and then showed *streptococcus hæmolyticus*. Pyuria was common, but urine cultures, made in all cases, were sterile in the most of them. The *B. coli* was found in the few that were positive. *Staphylococcus aureus* was isolated from one case with osteomyelitis of the jaw. An organism of the typhoid group grew from stool cultures in one case in which chronic gastroenteritis preceded the development of œdema. *B. coli* was present in one case of mastoiditis. Staphylococci and pneumococci were present in the post-nasal discharges from five patients. It would appear from our cases that no one type of organism is responsible, and that the disease is apparently not due to streptococcal infection, as such organisms are found only in superimposed infections.

Whatever the true nature of nephrosis may ultimately prove to be, the chief interest pathologically has always been centered on the kidney. Typical changes reported by various workers have been the presence of tubular degenerative lesions and the deposition of some lipid substance in the affected cells. This fat-staining substance has, since the work of Panzer¹² in 1906, been regarded as a cholesterol ester, and Windaus¹³ has more recently shown that such kidneys do have an increased cholesterol-ester content. A later careful microchemical study of one such case by Major and Hellwig¹⁴ appears to indicate that the fat-staining substance is a complex phosphatide.

It has become almost axiomatic to state that renal pathology does not indicate the clear cut differentiation of types of nephritis that clinical

classifications would lead one to expect. This is somewhat less true in children, and because of this fact and the relative infrequency with which pathological material can be obtained in cases of nephrosis, we have thought it worth while to briefly describe the kidney of four such cases from our clinic. They are described in sequence, according to the duration of definite symptoms of the disease before death or operation.

CASE 1

Aged 16 months; duration of illness, two and one-half weeks.

The kidneys were slightly enlarged, yellowish-pink in colour. The capsule stripped readily, leaving a smooth surface. The cortex was wider and somewhat paler than normal and encroached on the pyramids in some localities. Microscopically, the outstanding feature was the amount of granular material in the tubules. In some of the proximal convoluted tubules the surface of the cells toward the lumen was undergoing granular degeneration. There was some granular debris in the capsular space of the glomeruli, which were otherwise normal. Some capillary congestion of the cortex was present. Heart, spleen, suprarenal, and thymus were normal.

The liver was enlarged and yellowish-red in colour. The cut surface was greasy. There was much fat around the central veins, but less than the gross appearance of the organ would suggest.

In the duodenum there were several small submucous hæmorrhages.

CASE 2

Aged 4 years; duration of illness, eight months.

The kidneys were very large, weighing 243 gm.; continuous at the lower poles. Each was four and one-half inches long from pole to pole. There was much perinephritic fat. The kidneys were pale yellowish-pink in colour. Fetal lobulations were present. The cortex was narrow and the medulla ill defined. Microscopically, there was lymphocytic infiltration of both the cortex and medulla, more marked in the former. The glomeruli appeared to be intact, except for occasional pinkish staining granular material in the capsular space. Many of the convoluted tubules showed marked granular degeneration of the cytoplasm of the epithelial cells with the formation of granular and hyaline casts. Some of the latter had undergone calcareous degeneration.

Liver; weighed 787 gm. The surface was yellowish-pink and mottled. Microscopically, it showed fatty infiltration about the central veins. The suprarenals were more friable than normal. The spleen was softer than normal, and the malpighian corpuscles were indistinct. The heart muscle was paler than normal. Healed mediastinal tuberculosis was present.

CASE 3

Aged 8½ years; duration of illness, one year.

A piece of kidney was removed during a decapsulation operation. The kidneys when exposed were large and pale in colour. As soon as the capsule was cut the kidney substance bulged. The section removed was pale pinkish-yellow in colour. The cortex was wider than normal. The glomeruli appeared to be fairly normal, but the cells of the proximal convoluted tubules showed considerable degeneration, and many hyaline and granular casts were present. Fat stains showed the deposition of fat fairly marked in the degenerating cells.

CASE 4

H. D., aged 4½ years; duration of illness, nearly three years.

The kidneys were decapsulated three weeks before death. No bulging of the kidney occurred when the capsule was incised. The capsule stripped readily. Post mortem: the weight of each kidney was 93 grams. These organs were slightly enlarged, brownish red in colour; much perirenal fat was present. The cortex was paler than normal and somewhat widened. A few areas of subcapsular hæmorrhage were present. The medulla was brownish red in colour and appeared to be congested. The pelvis was slightly congested. Microscopically, there was a fine fibrosis throughout the kidney; more marked in some areas. Many of the glomeruli appeared to be perfectly normal, but others were atrophied or fibrosed, and showed proliferative changes in their capsules. The tubules showed more change than the glomeruli; many were dilated and contained albumin or desquamated cells, which had in some undergone calcareous degeneration. Some contained casts. The epithelial lining cells were the seat of degenerative changes.

The liver was enlarged and somewhat fatty. The deposition of fat was more marked about the periphery of the lobules. The heart was slightly enlarged, and showed some general fibrotic change. The suprarenals were normal. The spleen was enlarged (child died of streptococcal septicæmia).

The constant findings in these four cases were the increase in the size of the kidney and the preponderance of tubular changes. Glomerular changes were practically absent in the first cases and became progressively more pronounced in the later cases. It is cases like the fourth one, with fairly marked glomerular and interstitial changes, that make one think of the possibility of these cases progressing into chronic interstitial nephritis. Kaufmann and Mason¹⁵ regard the evidence as suggestive of such a possibility, but point out that such changes as occur in the glomeruli are a result of an organizing process about degenerated cells, rather than the result of any inflammatory reaction. Dyke,¹⁶ on the other hand, studied the pathology of nephritis with œdema, and concluded that only the large white kidney found in cases having had gross hæmaturia progressed into the secondarily contracted kidney. Case 3, of the four cited above, furnishes another suggestion of the possibility of secondarily contracted kidney developing. She died more than a year after the decapsulation operation at which the piece of tissue described was obtained. Death was in part due to an infection, but true uræmia with nitrogen retention and high blood pressure were also present. Unfortunately, no post-mortem examination was permitted.

Pathological evidence of the systemic nature

of the disease is shown in the constant presence of fatty infiltration in the liver and usually in the heart. Two cases had congestion and even actual ulceration of the mucous membrane of the bowel. In view of the experiments mentioned above of the effect of adrenalectomy on the production of nephrosis, it may be of interest that in three of our cases this organ was normal, but considerably more friable than usual in the other case.

CONCLUSION

Nephrosis is in all likelihood a systemic disease, in which the kidney is secondarily affected, either by the causative toxæmia itself or by alterations in metabolism produced by the general disorder.

Its etiology is still obscure. Streptococcal infections play no part in its production. The most common organisms isolated in such cases are staphylococci, and the most frequent infectious disease from which the child has suffered is measles.

The renal changes in early cases are fairly well limited to the tubules and are degenerative in type. In more chronic cases the progressively greater involvement of glomeruli and interstitial tissue suggest the possibility that such kidneys might become secondarily contracted ones.

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PRACTICAL CONSIDERATIONS IN THE SELECTION OF BLOOD SUGAR METHODS
FOR CLINICAL USE IN DIABETES*

BY I. M. RABINOWITCH, M.D.,

Montreal

BLOOD sugar studies, as is well known, are now widely applied in clinical medicine, and the great majority of those making use of such data are not trained biological chemists. It is because of the latter fact that the following observations appear relevant.

The interpretation of all laboratory data used in clinical medicine depends upon a proper appreciation of the principles of the tests employed in obtaining such data. This applies particularly to conditions where two or more technical methods may be used for the same purpose, but each of which may yield different values. The estimation of the blood sugar is an example.

Those engaged for the greater part of their time in laboratory work and acquainted with current laboratory literature know that the methods of blood sugar determinations are, at present, in a very unstable state. Improvements are being made continually, and for these we are indebted particularly to Professors Folin and Benedict. Unless, however, one is familiar with the reasons for the alterations of established methods, that is, unless one understands the underlying chemical and physical principles, it is a rather unsafe procedure to change routine methods which have been subjected to thorough trial or replace them by other new procedures which may appear.

In the selection of a blood sugar method there are certain important facts to bear in mind. Firstly, it is now generally recognized, though more by the biological chemist than by the clinician, that the methods commonly in use for determining the concentration of sugar in blood, yield values much greater than would be accounted for by solutions containing the same amounts of glucose in water. There are various reasons for this. One of these is that no one method is specific for glucose. What

these methods measure are reducing substances of blood, and glucose does not account for all of the latter. Since no method is specific, the selection must depend upon other considerations, the most important of which is the following. *A blood sugar test for clinical use fulfils its function only when it detects alterations in carbohydrate metabolism.* Other considerations are, the details of the preparation of reagents, stability of these, and technical details of the actual test. It is obvious that the fewer the number of the above-mentioned details, the simpler will be the test, errors will be reduced to a minimum, and the wider will be its application to clinical work.

In our laboratory the Benedict-Myers method is still used for *routine* clinical work. Many visitors to our department, the majority of whom are making blood-sugar estimations but are not trained chemists, have commented unfavourably on the fact that this method is still in use. The writer finds it difficult to agree with the opinions held. It is this fact, chiefly, which has prompted the publication of this paper.

In the course of the routine work of this hospital, approximately 40,000 analyses have now been made with this picric acid method. As a result of this experience, we are quite in agreement with Benedict in his assertion that rarely has the clinician been misled in the interpretation of blood-sugar results obtained by the picric acid method. We have also frequently noted the fact, mentioned by Benedict, that the rate of return of the blood sugar to the normal level, as found with the picric acid method, parallels the clinical progress of diabetes more closely than the results of the Folin-Wu method, with which the decline in blood-sugar concentration is found to be more rapid. The reason for this may be found when blood-sugar methods become more exact. One possible explanation is suggested. Picric acid detects

* From the Department of Metabolism, The Montreal General Hospital.

sugars other than glucose, and the metabolism of some of these may also be disturbed.

Some of the conditions in diabetes which lead to hyperglycæmia are: dietary indiscretions; fever; suppuration; anæsthesia; and injuries (operations, etc.). These conditions have been observed frequently in our diabetic clinic, and a large amount of blood-sugar data concerning them have, in the course of time, accumulated. For example, as a routine, all diabetics have blood-sugar examinations before and one hour after operation, whether the anæsthesia used is general or local. In diabetics coming regularly to our clinic, the effects of fever, dietary indiscretions, etc., on the blood sugar are observed as a routine. In order to test the sensitivity of some of the more common blood-sugar methods in detecting alterations of carbohydrate metabolism, comparative studies were made of the Folin-Wu, Folin and Benedict-Myers methods. The accompanying tables show a summary of our experiences with these three methods for estimating blood sugar in two of the above mentioned conditions, namely, anæsthesia and dietary indiscretions.

TABLE I.

THE EFFECT OF ETHER ANÆSTHESIA ON THE BLOOD SUGAR IN 31 CASES OF DIABETES MELLITUS MEASURED BY THE FOLIN-WU, FOLIN AND BENEDICT-MYERS (PICRIC ACID) METHODS.

	METHOD		
	Folin-Wu	Folin	Picric acid
Hyperglycæmia	23	18	27
No hyperglycæmia	8	13	4
Blood sugar per cent			
Maximum	232	196	256
Minimum	099	088	103
Average	188	158	227

It will be seen in Table I. that of thirty-one cases, disturbances of carbohydrate metabolism following anæsthesia were found in twenty-seven with the picric acid method; in twenty-three with the Folin-Wu method; and in eighteen only with the Folin method. The picric acid method was therefore the most sensitive test.

The interpretation of the differences between the results of the two copper tests may be found in a study of the maximum, minimum and average blood sugar values, and in a detailed analysis of the data of individual cases. It might be expected that, while the Folin method is supposed to measure glucose only, the incidence of hyperglycæmia would be the same as with the Folin-Wu method, though the values would

differ, being higher with the Folin-Wu method, since this tends to measure the total reducing substances. That blood-sugar increase does occur is obvious from the following case. The blood sugars after anæsthesia were higher, as determined by the Folin method, than before it; *but the increase was not sufficient to lead to a value corresponding to the accepted standard of hyperglycæmia.* Thus:

TIME	METHOD		
	Picric acid	Folin-Wu	Folin
Before anæsthesia	0.111	0.097	0.074
After anæsthesia	0.166	0.133	0.098

From this it will be seen that the Folin-Wu method led to a result higher than the accepted limits of normality. Of all the tests the picric acid method showed the most marked degree of hyperglycæmia. This may be seen from a study of the maximum, minimum and average values recorded.

With dietary indiscretions the results are still more striking. During their periodical visits to the clinic all patients, as a routine, are asked about any changes in diets that may have been made. All of the patients recorded here admitted alterations in diets, some voluntarily, emphasizing that there was no sugar in the urine in spite of the changes, in order to obtain increases of diet. The subjects used in this investigation included only those whose blood sugars at previous visits were normal.

TABLE II.

THE EFFECT OF DIETARY INDISCRETIONS ON THE BLOOD SUGAR IN 46 CASES OF DIABETES MELLITUS MEASURED BY THE FOLIN-WU, FOLIN AND BENEDICT-MYERS (PICRIC ACID) METHODS.

	METHOD		
	Folin-Wu	Folin	Picric acid
Hyperglycæmia	18	11	26
No hyperglycæmia	28	35	20
Blood sugar per cent			
Maximum	244	208	270
Minimum	106	079	125
Average	181	161	217

It will be observed in Table II that in spite of definite histories of dietary indiscretions, the Folin method, more specific for glucose than the other two, failed to record hyperglycæmia in thirty-five of the forty-six cases. It may here be observed that it does not follow that there were disturbances of the carbohydrate metabolism in all of these cases; but the fact remains that dietary indiscretion is the commonest cause

of hyperglycæmia in diabetes, and that in many cases of such indiscretions, when the picric acid and Folin-Wu test indicated this condition, the new Folin method did not do so. A study of the maximum, minimum and average values again shows that the picric acid method was the most sensitive in detecting alterations of diets.

Apropos of the details of tests, such as the preparation of reagents and their stability, the writer does not know of any method which is more satisfactory than the Benedict-Myers. Its greater simplicity makes for greater accuracy. The apparatus required is simple. Since errors due to surface oxidation are not as important as with the copper tests, ordinary test tubes may be used. These are readily graduated with the aid of the pipette, at the 10 or 20 c.c. mark. The reagents are few and very easily prepared. The standard consists of glucose in saturated picric acid, which keeps almost indefinitely at room temperature. The only other solution is 10 per cent sodium carbonate. Since glucose is obtainable in pure form, the only impurity is to be found in the picric acid and the test for the

purity of this substance is extremely simple (Folin and Doisy method).

RÉSUMÉ

The selection of a method for blood-sugar estimation, as for all laboratory methods, should depend upon a knowledge of the principles involved in the test and the use it is intended to make of the data. In clinical work, a blood sugar test fulfils its function only when it detects alterations of carbohydrate metabolism. Other considerations are simplicity of technical details of the test, and the preparation and stability of the necessary reagents. The fewer the reagents required and the longer they keep under ordinary conditions, the more practical does the test become; the fewer the manipulations, the simpler is the test, and the less are the sources of error. Experimental data are presented which show that the picric acid method fulfils these conditions, and for routine clinical work its use is not only justified but ideal.

A COMPARISON OF THE BUFFER CAPACITY OF VARIOUS MILK MIXTURES USED IN INFANT FEEDING*

BY ANGELIA M. COURTNEY, B.A., AND ALAN BROWN, M.B. (TOR.),

Toronto

BY the buffer capacity of a milk mixture is meant its effectiveness in holding added acid so that the degree of acidity of the mixture is not increased in proportion to the quantity of acid added. The buffer capacity of a milk mixture depends mainly upon the protein content with its acid-binding amino-radicals and those salts of its mineral content which react with added acid to form acid salts. Thus, one of the buffer salts of milk is basic potassium phosphate, which uses a definite quantity of the added acid and thereby forms acid potassium phosphate; in contrast to this neutral sodium chloride makes no demand upon added acid.

According to Marriott,¹ one of the outstanding advocates of acid milks in infant feeding, the hydrogen-ion concentration of the stomach con-

tents of normal breast-fed infants at the height of digestion is pH 3.75, while that of normal infants taking cow's milk varies from pH 4.75 to pH 5.3. He calls attention to the fact that it requires from three to four times as much hydrochloric acid to bring the hydrogen-ion concentration of sweet cow's milk to pH 3.75 as it does to bring breast-milk to the same pH . Lactic acid milk, on the other hand, needs little more than breast-milk does. That is, sweet cow's milk has three to four times the buffer capacity of breast-milk, but in lactic acid milk the buffer is materially reduced and the hydrogen-ion concentration increased by the lactic acid produced in the souring.

Schiff and Mosse,² in a monograph on the use of acid milk mixtures in infant feeding, emphasize the importance of maintaining a normal stomach acidity, particularly to prevent abnormal bacterial break-down of food, also to

* From the laboratories of the Sub-Department of Pædiatrics of the University of Toronto and the Hospital for Sick Children, Toronto.

favour peptic digestion. There are many other writers who advocate the use of food mixtures designed to prevent the lowering of stomach acidity whose work will not be reviewed here.

A comparison of the buffer content of various food mixtures and forms of milk used in making them has been carried out in this laboratory. The object was to obtain information as to their relative value as agents in the prevention of the lowering of stomach acidity.

The method used was an application of that of Levy, Rowntree and Marriott³ for the determination of the hydrogen-ion concentration of blood, of which an adaptation was made by Kramer and Greene⁴ for the estimation of the hydrogen-ion concentration of milk and by Tisdall⁵ for that of stools. The treated samples were dialyzed in collodion sacs against freshly boiled distilled water for thirty minutes, and the hydrogen-ion concentration of the dialyzate was estimated colorimetrically. For the colorimetric reading, samples to which the appropriate in-

dicator had been added were compared with Clark's colour chart, and the readings were checked by comparison with tubes containing Sørensen standards. The Clark chart is accurate and easily used in the range required for this investigation and served as a permanent standard in case the Sørensen standards were found to be spoiled when needed. To use this method successfully extreme care is necessary, both in the rinsing of all containers with freshly boiled distilled water, and in the use of uniform tubes and uniform amounts of sample and indicator for the colorimetric comparison.

The results obtained are given in two tables. In Table I the foods are arranged in the order of their nearness to breast-milk as regards the effect on hydrogen-ion concentration of adding to each the same amount of N/10 HCl, 2 c.c. This quantity was selected as that which, under our conditions, was found to raise the hydrogen-ion concentration of ten c.c. of breast milk approximately to the optimum stomach acidity

TABLE I.
EFFECT ON PH OF ADDITION OF 2 C.C. N/10 HCl TO
10 C.C. OF FOOD. AVERAGE VALUES.

Food	Initial pH	Resulting pH
Breast-milk (various mothers)	7.0	3.6
Butter-soup, 2/3, water, 1/3	6.7	2.7
Butter-soup, 2/3, lactic acid milk, 1/3	4.2	3.5
Butter-soup, 2/3, protein milk (powder), 1/3	4.8	3.5
Butter-soup, 2/3, lactic acid milk (powder), 1/3	4.9	3.7
Lactic acid milk	4.3	3.9
Protein milk (powder)	4.6	3.9
Acidulated S.M.A. protein, propri- etary protein milk	4.4	3.9
Lactic acid milk (powder)	4.7	4.2
Thick feeding made with 25 oz. 2% lactic acid milk and 2½ oz. farina	4.6	4.2
Butter-soup, 2/3, evaporated milk, 1/3	6.4	4.7
Butter-soup, 2/3, pasteurized milk, 1/3	6.7	4.8
Pasteurized milk dilution, 7 oz. in 20, with 1 oz. cane sugar	6.8	4.9
S.M.A. (proprietary reconstructed breast milk)	6.7	5.2
Evaporated milk, dilution, 12 oz. in 40, with 1 oz. Imperial granum, cooked 6 hours	6.3	5.3
Evaporated milk, dilution, 10 oz. in 30, with 1 oz. barley flour	6.4	5.3
Recolac (proprietary reconstructed breast milk)	7.5	5.5
Evaporated milk	6.5	5.5
Similac (proprietary reconstructed breast milk)	7.3	5.8
Pasteurized milk	6.7	5.8
Thick feeding made with 20 oz. 2% pasteurized milk and 2 oz. farina	6.5	5.9
Dryco (proprietary dried milk)	6.7	5.9

TABLE II.
ACID REQUIREMENT TO BRING PH OF FOODS APPROXI-
MATELY TO pH 3.6. AVERAGE VALUES.

Food	Initial pH	C.C. Added Acid	Resulting pH
Breast milk	7.0	2	3.6
Butter-soup, 2/3, water, 1/3	6.7	0.6	3.5
Butter-soup, 2/3, lactic acid milk, 1/3	4.2	2	3.5
Butter-soup, 2/3, prot. milk powder, 1/3 ...	4.8	2	3.5
Butter-soup, 2/3, L.A.M. powder, 1/3	4.9	2	3.7
Lactic acid milk	4.3	2.6	3.6
Protein milk powder ...	4.6	2.6	3.8
Lactic acid milk powder	4.7	2.7	3.7
Butter-soup, 2/3, evapor- ated milk, 1/3	6.4	3.0	3.5
Butter-soup, 2/3, pas- teurized milk, 1/3 ...	6.7	3.0	3.7
Pasteurized milk dilu- tion, 7 in 20	6.8	3.0	3.5
S. M. A., proprietary breast-milk	6.7	3.5	3.6
Thick feeding made with L.A.M.	4.6	4.5	3.7
Evaporated milk dilu- tion, 12 in 40, long cooking	6.3	4.5	3.5
Recolac (proprietary breast-milk)	7.5	5.0	3.6
Similac, (proprietary breast-milk)	7.3	5.0	3.7
Evaporated milk dilu- tion, 10 in 30	6.4	5.25	3.6
Evaporated milk	6.5	7.0	3.6
Pasteurized milk	6.7	8.0	3.5
Thick feeding made with undiluted pasteurized milk	6.5	8.5	3.5
Dryco	6.7	9.5	3.7

during digestion, according to Marriott, pH 3.75.

In Table II are given the results of an attempt to determine how much N/10 HCl is required to bring each of the foods approximately to the above-mentioned hydrogen-ion concentration, and the order of arrangement is that of nearness to breast-milk in the number of cubic centimetres needed to accomplish this. Many trials were necessary with some of the mixtures before the desired pH was obtained, and accordingly the averages in Table II for the most part represent a smaller number of determinations than do those in Table I. However, the foods fall into nearly the same order of arrangement in both tables.

SUMMARY OF FINDINGS

Butter-soup, two-thirds, with lactic acid or protein milk, one-third, gives a food which makes about the same demand upon stomach acidity as breast-milk does. The undiluted acid milks rank in this respect slightly lower than the butter-soup mixtures, and in their class falls acidulated S. M. A. Protein, a proprietary protein milk. Lactic acid milk-powder seems to contain a little more buffer than the liquid milk or protein milk-powder.

The next class in the order of amount of buffer content includes the butter-soup, two-thirds, evaporated or pasteurized milk, one-third mixtures, and a seven parts in twenty ordinary milk dilution. These require 50 per cent more acid than breast-milk does to bring them to pH 3.75.

The next group includes two evaporated milk dilutions with added carbohydrate; one, ten parts of milk in thirty; and the other twelve parts in forty, and cooked six hours. With these are to be classed three reconstructed breast milks, S. M. A., Reolac and Similac, also a thick feeding made with lactic acid milk. Except S. M. A., which really lies between this group and the preceding, the foods of this class need about two to two and one-half times as much acid as breast-milk to bring them to pH 3.75.

The remaining foods in the tables are undiluted milks, unless the thick feeding made with undiluted milk is actually concentrated. These require upwards of three times as much acid as breast milk to bring them to approximately pH 3.6. The differences among the whole milks shown in Table II must be of

some significance, for the separate values making each average varied but little. The reconstruction of the dried and evaporated milks was carried out in the dairy as if for ward use and not with laboratory exactness, but the findings ran almost the same from day to day.

It was interesting to find with Dryco that, though not very much more acid was needed to bring it to the desired acidity than in the case of pasteurized milk, it showed small response to successive increases in the amount of acid added after a certain point. This behaviour is shown in detail as follows: 8 c.c. N/10 HCl to 10 c.c. of the milk, pH 4.3-4.1; 8.5 c.c. acid, pH 4.2-3.9; 9 c.c. acid, pH 4.0-3.8; 9.5 c.c. acid, pH 3.8-3.6; 10 c.c. acid, pH 3.5; 10.5 c.c., pH 3.5-3.4. The finding with 9.5 c.c. acid seems to be most nearly comparable with the values in Table II as a whole.

One of the food mixtures in the list forms a class by itself. This is butter-soup, two-thirds, water, one-third, in which the buffer capacity is less than in breast milk. This food needs only 0.3 as much acid as breast milk to bring its hydrogen-ion concentration to pH 3.75.

The information derived from these observations seems to suggest another reason for the favourable effect of the use of the acid milks in combination with other food mixtures. It has been our observation in the feeding of many hundreds of infants that when an acid milk is combined with, say, a butter-flour mixture, or even farina, the clinical results are distinctly more favourable than when these are used in combination with ordinary sweet milk. The procedure of combining butter soup with either cultured lactic acid milk or lactic acid milk-powder or protein milk-powder is merely another link in the physician's armamentarium in feeding certain difficult cases. That all thick cereal mixtures be made with acid milks is also suggested, as an improvement over the use of sweet milk in their preparation.

Thanks are due Miss Jean Hutt and Miss Bertha Coates of the dairy for their great assistance in preparing the material for this work.

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A METHOD OF SERUM THERAPY FOR SEPTICÆMIA*

BY FRED T. CADHAM, M.D.,

Winnipeg

IN any discussion on septicæmia it appears necessary to define the term. Admittedly that is difficult. Infection may exist as a small localized focus, or as a condition where all defenses of the body are overcome and the micro-organisms travel freely through and even, on occasion, proliferate in the blood stream. Between these two extremes lies a wide variety of clinical conditions. The terms septicæmia, bacteriæmia, sepsis, pyæmia, and sapræmia are supposed to define certain of these conditions, and to convey to the mind a definite clinical picture. So often, however, do the conditions indicated by these terms grade into one another that a sharp line of distinction cannot be drawn. The very nature of pyæmia, a condition of supposed localized and circumscribed areas of infection, suggests a previous invasion of the blood stream, nor is a subsequent invasion impossible.

Commonly, the term septicæmia is applied to states associated with the finding of bacteria in the blood stream. Increased knowledge, however, derived from the perfection and extension of blood-culture methods, has shown that in many diseases, not designated or recognized as septicæmia, bacteria are to be so found. Invasion of the blood stream, for longer or shorter periods, by the causative organisms is now frequently noted in such diseases as typhoid and pneumonia. Moreover, it is to be expected that in the course of syphilis there has occurred at some time between the onset of the primary lesion and the appearance of the secondary manifestations an invasion of the circulatory system. Again, we distinguish between a meningitis and a meningococcal septicæmia, though the organism may be recovered from the blood in both conditions. As Churchman¹ states: "A definition of septicæmia free from all possible objections would appear to be impossible to frame."

There exists, however, a class of cases in which the symptoms due to a general invasion

overshadow those of local origin and which is characterized in part, clinically, by an irregular fever—the so-called septic temperature—by chills and sweats, and associated with a more or less constant invasion of the blood stream by micro-organisms. To such we may apply the term septicæmia. On occasion it is designated by its source, as puerperal or endocardial; also, the name of the causative organisms may, with advantage, further define the condition. Thus the term "puerperal streptococcus septicæmia" designates a fairly clear clinical condition.

The treatment of these patients, and almost without exception their condition is serious, has always been difficult and nearly always discouraging. We lean on general measures in the attempt to increase the patient's resistance, and we try special methods in the hope of destroying or attenuating the infective micro-organism. When feasible, surgical intervention for the elimination of foci is the rule.

The general methods of treatment have been skilfully set forth by Sir Thomas Horder.² They include careful nursing, rest, and selected diet. It might not be out of place here to note two of the points he stresses in the care of these patients, namely, the prompt recognition of the condition, and the prompt institution of a definite method of treatment.

It appears likely, however, from our present knowledge, that it is in the further development of one or all of the special measures, that is, the use of serums, vaccines, foreign proteins, and the intravenous use of the dyes, that success may be ultimately looked for in the treatment of septicæmia.

A simple and obvious principle may be stated at the outset, that, since in this condition there is a definite failure of the body tissues to organize the required resistance or immunity, it would appear logical, if possible, to supply that immunity in passive form. All are familiar with attempts that have been made in this direction. For instance, take the

* From the Department of Bacteriology, University of Manitoba Medical School.

case of antistreptococcus serum. Since the micro-organism most frequently associated with septicæmia is a streptococcus, various stock antistreptococcic serums have been prepared and placed on the market. Too often they have proved a frail reed.

It will be of advantage to the argument to consider some of the possible reasons why the use of such serums has not resulted in more success. First: many types of streptococci that may be responsible for a septicæmia exist, and a stock serum too often lacks the essential antibodies for the type causing the infection in the patient under treatment. With cultures of streptococci obtained from twelve patients with a streptococcus septicæmia, I failed to obtain agglutination of the causative organisms by various stock serums in ten, and a partial agglutination was noted in but two instances. However, it is fair to state that the agglutination power of a serum is not an exact criterion of its efficacy, nor does the apparent absence of that power necessarily indicate that such a serum is without therapeutic value.

Second: several humoral factors are concerned in the reaction that eventually leads to the destruction of an infective micro-organism following the administration of a specific antiserum. Ehrlich established the belief that in the body tissues there occurs a reaction between the antibody contained in the plasma and the foreign body (infective agent). This may take the form of the action of an antitoxin on its toxin, or of the agglutination of the foreign body, or the precipitation of its products through the action of a specific antibody, or of a union of the foreign body with its particulate antibody. The latter may cause a destruction of the foreign body which, in the case of bacteria, is demonstrated by the death or lysis of the bacterial cell. Now to facilitate the lysis or death of a bacterium *in vitro* by its specific antibody, complement (alexin) a substance or state normally present in the blood serum is required. It is reasonable to infer, even if there exists but limited experimental evidence to support the inference, that *in vivo* complement fulfils a similar and important function.

Now the complement power of the person suffering from infection may vary widely.³ Sufficient complement to complete the reaction

between the micro-organism and its specific antibody may be looked upon as an asset if not a necessity. It is suggested that if the blood of the patient is low in complement power, then the inoculation of a serum containing definite antibodies to the infective bacterium may fail to give the expected beneficial results. Such was found to be the case in six patients investigated, who showed a low complement power in the blood, and who failed to improve with the administration of a serum containing immune bodies corresponding to the micro-organism causing the infection. Conversely, an investigation of six patients who were not doing well, and whose blood gave a high complement power, showed that the antibody content of their blood serum for the infective organism was low.

Besides the use of stock antistreptococcus serums some further attempts at therapy along this line have been made. Sir Almroth Wright⁴ introduced a method to which he gave the name "immuno-transfusion." The blood is withdrawn from a donor inoculated with a fixed amount of a vaccine, and a few minutes to an hour subsequently the patient is transfused with this blood. Later, Colebrook and Storer⁵ suggested the use of defibrinated blood from a donor who had been inoculated with a vaccine one to five hours previous to the time of the withdrawal of the blood. They reported some success. A further method of transfusion of immunized blood has been described by Hooker,⁶ Dick,⁷ and several others. A donor was immunized with a vaccine and, after several days, the patient was inoculated with this donor's blood. Good results have been reported in several cases treated by this latter method.

The value of transfusions of normal blood in septicæmia has long been a matter of dispute. Here, if a definite specific action on the invading organism is expected, one pre-supposes that the donor has the required immune bodies in his serum. The method advocated by Polak of small repeated transfusions seems to have given the most favourable results. One must bear in mind, however, that in whole-blood transfusions, even on occasions when the bloods appear compatible *in vitro*, the donor's blood cells may be destroyed in the circulatory system of the patient. This throws a further

burden on the immunity mechanism of the patient, and an added burden on the complement reserves of the body. Moreover, transfused whole blood, as suggested by Wright, may form a pabulum for the further multiplication of the infective organisms.

In view of the above considerations it appeared logical to attempt to treat some of these patients by the inoculation of an animal serum containing immune bodies, and during the same period with transfusions of human serum. Within the past three years eighteen patients diagnosed as clinical cases of septicæmia, and who had shown repeated positive blood-cultures, were treated. Of these sixteen recovered.

The method adopted was as follows: The invading micro-organism was obtained from blood cultures and grown in serum-glucose broth. The resulting growth having been centrifuged three times in normal saline, a vaccine, in which the micro-organisms had been heat-killed at the minimum lethal temperature, was then prepared, and inoculated into rabbits and guinea pigs. These animals tolerate comparatively large doses of a vaccine containing either streptococci or staphylococci, especially if the organisms are washed free of the media. The dose of the vaccine, starting with one-quarter billion and working up to three billion organisms, was given on alternate days. An agglutination titre of one to five thousand may be obtained as early as the sixth day. Any time after the fifth day blood was withdrawn from the heart with aseptic precautions, and without causing the death of the animal. This blood was placed in the ice chest for eight hours, and then the serum was pipetted off. The patient was inoculated subcutaneously with from three to four c.c. of this serum. Twelve patients were treated with rabbit serum, and six with guinea pig serum. There seems to have been no appreciable difference in the result obtained.

A donor whose blood was completely compatible with that of the patient was obtained as soon as possible. The donor reported at the laboratory and from 50 to 60 c.c. of blood were withdrawn in large vacuum tubes. This was left at room temperature for fifteen minutes and then placed in the ice chest for fifteen hours. The serum was next pipetted

off with all aseptic precautions, examined for sterility, diluted with equal parts of saline, and given by means of a syringe to the patient intravenously. Thus, the patient received an inoculation of the animal serum containing the antibodies subcutaneously, and also received a transfusion of from 25 to 30 c.c. of the donor's serum containing complement. Originally, the treatments were given one week apart, but this was subsequently shortened to two-day intervals. Treatment was continued until negative blood cultures were obtained and the patient showed considerable improvement. The greatest number of treatments given to any one patient was seven.

To isolate the infective organism, culture it, inoculate the animal with the vaccine, and to await the development of amboceptors of value, required at least five days; and to obtain a serum with a more powerful agglutination titre, twelve days. Frequently, the emergency of the case did not brook any such delay. To overcome this difficulty some rabbits and guinea pigs were inoculated with various strains of streptococci and staphylococci. Certain animals received inoculations of a vaccine prepared from fifteen strains of streptococci, which had been obtained from as many different cases of local or general sepsis. Patients were treated at once with the serum from these animals, pending the development in other animals of a specific serum.

ILLUSTRATIVE CASE

Mrs. S., aged 39, strong and healthy, suffered a miscarriage on December 28. On December 31 she complained of feeling chilly, and her temperature rose to 103° F. The temperature continued to range from 97° to 105°, associated with chills and sweats. On January 13th the blood culture showed a hemolytic streptococcus. On January 20th she developed a panophthalmitis of the right eye. In addition there was a cellulitis of both heels. Petechial hemorrhages had appeared on the limbs. The patient was weak, listless, and rapidly losing ground. The complement power of the blood at this time showed 60 per cent of the normal. On January 21st, 30 c.c. of human serum were administered intravenously, and, on January 23rd, 3 c.c. of serum from a rabbit which had been immunized with the streptococcus were given subcutaneously, also 30 c.c. of human serum, intravenously. Next day the patient stated that she felt much better. The chills and sweats ceased. The temperature remained lower and changed in type (see Chart I.). The pulse also improved in quality. On January 30th the combined serum treatment was again administered. Blood-culture on January 31st was negative. Her condition rapidly improved, the temperature dropped, the panophthalmitis and cellulitis subsided. The complement power of the blood returned to 90 per cent of normal. She went on to complete recovery, though the sight of the eye was lost.

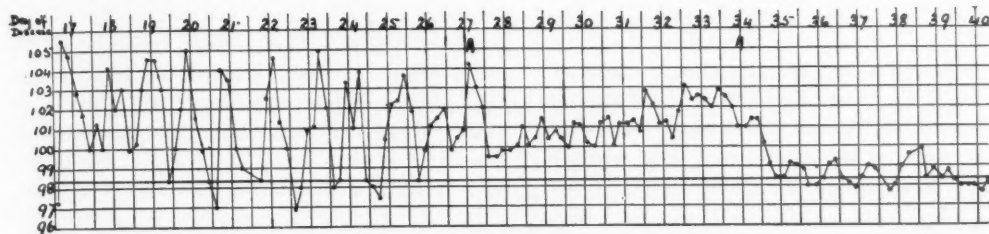


CHART I.—A, combined treatment given.

COMMENT ON CASES

All the patients, except one (No. 13, Table I), were seen only when the course of the disease was well advanced. Each case was considered grave, and this method of treatment was instituted with the majority as a last resort. A definite beneficial response within twenty-four hours of the administration of the first injections of serum was noted in five of the patients, while in the others the improvement was gradual. In two instances the fever fell by crisis (see Chart II); in several there was a distinct change in the type of the curve (see Chart I); and in all cases the swing of the extremes in temperature was modified following the treatment. The pulse improved in quality with the smoothing-out of the temperature.

About or coincident with the time of obtaining a negative blood-culture a quick and distinct improvement in the patient's general

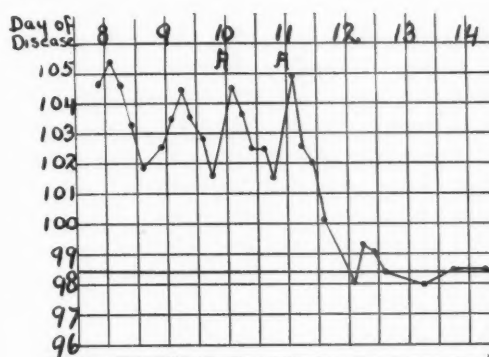


CHART II.—A, combined treatment given.

TABLE I.
SUMMARY OF CASES

Case	Age Years	Origin	Blood Culture	Complications	Day of Disease Treatment Instituted	Complement power of patient's blood per cent of normal	Number of combined treatments	Day following first treat- ment that negative blood culture was noted
1	39	Puerperal	<i>S. hæmolyticus</i>	Panophthalmitis:				
2	31	Septic throat	<i>S. hæmolyticus</i>	abscess of leg	25	60	2	8
3	36	Puerperal	<i>S. hæmolyticus</i>	Endocarditis	22	80	5	6
4	42	Septic throat	Diplostreptococcus	Abscess of lung	14	70	6	11
				Panophthalmitis:				
				cellulitis of arm				
5	23	Cryptogenetic	<i>S. viridans</i>	and leg	6	90	4	12
6	47	Injury of arm	Streptococcus and Staphylococcus	Endocarditis	62	40	7	15
7	14	Otitis	Streptococcus	Extensive cellulitis	10	60	2	Positive
8	22	Mastoiditis	<i>S. hæmolyticus</i>	Mastoiditis	5	110	3	3
				Abscess of wrist:				
				arthritis	16	90	4	8
9	30	Puerperal	Streptococcus	Abscess of buttocks	31	70	6	10
10	43	Perforated stomach ulcer	Staphylococcus	Peritonitis	7	100	3	8
11	16	Injury to leg	Staphylococcus	Cellulitis	13	90	2	4
12	44	Cryptogenetic	<i>S. hæmolyticus</i>	Endocarditis	3	70	3	7
13	23	Puerperal	Streptococcus		5	110	2	3
14	14	Otitis	Staphylococcus	Multiple abscesses	21	40	6	12
15	30	Puerperal	Streptococcus		10	90	3	7
16	15	Otitis	<i>S. hæmolyticus</i>	Mastoiditis and meningitis				
				Endocarditis	12	80	1	Positive
17	60	Cryptogenetic	<i>S. hæmolyticus</i>	Cellulitis of arm	25	60	3	7
18	50	Injury to hand	Streptococcus		8	90	3	7

Recovery in cases except Nos. 6 and 16.

condition took place. This was a characteristic feature.

Two patients had developed a panophthalmitis; this condition subsided without surgical interference, following the use of the serum, but the sight of the eye in each case was lost.

While undergoing treatment one patient (No. 3) developed an abscess of the lung. Her general condition, however, continued to improve, and the blood-culture was reported negative. Aspiration failed to relieve the abscess, but she expectorated quantities of pus containing abundant hæmolytic streptococci, and the condition eventually cleared up.

Another patient (No. 14), when first seen, had multiple cutaneous abscesses. Later, and subsequent to treatment, the inflammatory area about these abscesses subsided, and, while staphylococci could be noted in the stained smear of the aspirated material, yet the organisms failed to grow in culture.

One patient (No. 6) was suffering from an extensive cellulitis of the arm, following an injury. Blood-cultures showed the presence of both streptococci and staphylococci. A paralytic state of the bowel had developed, with extreme distension of the abdomen, and she was able to take only a small amount of liquid nourishment. She was semi-conscious. Following the serum treatment the temperature became lower. However, the abdominal distension progressed, and she died in four days. The blood-cultures in this case remained positive.

Another patient (No. 16) with otitis media, whose blood-culture showed the presence of hæmolytic streptococci, developed a mastoiditis followed by symptoms of meningitis. This patient had been treated with mercurochrome and polyvalent antistreptococcic serum without benefit. When seen, he was unconscious. He was given one of the combined treatments, but his general condition remained unchanged, and he died two days later.

DISCUSSION

Naturally, the question arises, how can transfusions of such a small amount of serum as 25 to 30 c.c. diluted as it must be in the recipient's blood, be of value? However, experimental evidence has shown that, both *in vitro* and *in vivo*, blood with a weak or inactive

complement-power may frequently have that power raised (the complement reactivated) by the addition of small amounts of fresh serum high in complement-power. In the early stages of an acute infection, and as noted in two cases of this series, the complement-power of a patient's blood may be above normal. Since this power may fall with comparative rapidity during the progress of the disease, it was thought advisable to give the transfusions in all cases.

An investigation, after treatment, of the blood for opsonins in six of the patients not only demonstrated an increase of the bactericidal power of the serum, but also showed that the patient's opsonic index to the infective micro-organism was raised. The inference has been drawn that the transfusion of fresh serum reactivates the complement or stimulates its formation with a beneficial result to the patient; but, that such a result depends entirely on bacteriolysis through the action of complement lacks proof. Bacteriotropins (immune opsonins), similar to those found in the homologous immune animal serum, may also be transferred with the human serum, giving rise to an increase in phagocytosis. Moreover, the possibility arises that occasionally a bacteriophage for the infective micro-organism may exist in such serums and be transferred to the patient.

The animal serum containing antibodies was inoculated subcutaneously, contrary to the accepted procedure of giving such serums intravenously. On two occasions in which I gave this serum intravenously the patients experienced within a half an hour a severe reaction, characterized by faintness, pallor, sweating, and feeble pulse. Whether the reaction was due to anaphylaxis, or to a sudden liberation of bacterial toxins from the destruction of the bacteria, or to some other cause, I was unable to determine. Subsequent tests showed the cutaneous reaction to be negative to the serum. I found that the animal serum was absorbed rapidly, when given subcutaneously.

A local reaction, characterized by hyperæmia and swelling at the site of inoculation, developed after the third or later treatment with the animal serum in four of the patients. However, this anaphylactic reaction subsided within three days after discontinuance of the treatment. It

was expected that a reaction might be noted following repeated transfusions of human serum. Only one patient, however, showed a slight reaction—faintness, followed by a sweat coming on within fifteen minutes of receiving the fifth transfusion.

Evaluation of the results of a method for the treatment of septicæmia is a difficult matter. We turn to experiment, but experimental study lacks finality because of the resistance of laboratory animals to bacterial blood-invasion. Then, too, individual cases show a wide variation from each other, not alone because of the variation in the resistance of the host, but also because many different micro-organisms or different strains of the same organism may be responsible for a septicæmia. Moreover, on occasion, patients with septicæmia, even those severely ill, will recover without therapeutic aid.

The results obtained in the patients treated appear to justify a further trial of this method.

SUMMARY

Eighteen patients with septicæmia were treated with repeated inoculations of a homologous immune animal serum, and during the same period with repeated transfusions of human serum. Sixteen of the eighteen recovered.

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INFECTIONS OF THE EAR, NOSE AND THROAT FROM THE GENERAL PRACTITIONER'S VIEWPOINT*

BY L. DE V. CHIPMAN, M.A., M.D., C.M.,

Saint John, N.B.

IT was the writer's good fortune to be in general practice for five years, and it is with the general practitioner's problems in mind that this subject is treated.

INFECTIONS OF THE EAR

Infected ears naturally fall into two classes, *viz.*, acute and chronic. This is not a mere arbitrary division, but is of the utmost importance. As we shall see later, one can take chances on symptoms in an acute aural infection that would be fatal in a chronic one.

Let us picture an acute case, an ordinary acute otitis media, such as you frequently see. There is usually a history of a "cold"; or evidence of adenoids; there is pain in the ear, in infancy often indicated only by restlessness and crying; there is fever and impaired hearing. Examination of the ear reveals a reddened, bulging drum, with all landmarks obliterated. This is the typical picture though there are frequent variations from the above symptoms. There may be no pain and no fever;

we may see the case early when there is no bulging, in which event one can be content to wait and watch developments.

When the drum is bulging the treatment is obvious. As in surgery elsewhere cut down upon the pus. The drum should be freely incised. The technique of this little operation is important. The knife should be held delicately between the thumb and first two fingers, so that nothing can drive the knife with force, even if the patient jumps. The incision should be made in the lower part of the drum and continued in a curved direction up the posterior part. It is a difficult little operation if done with perfect technique, but with the modern electrically illuminated otoscope, even if one is not accustomed to working with one eye and a head mirror, one can make a simple puncture, and a simple puncture is better than nothing. The beginner is most apt to fail through incising the swollen posterior canal wall in mistaking it for the drum. One free incision is enough. Do not scarify the drum.

We have now reached the second stage.

* Presented under the extra-mural lecture course in New Brunswick.

Either the drum has been incised, or it has ruptured, and we have an acute discharging ear. The all-important thing now is to keep the ear clean. It is astounding how often one sees these ears almost hermetically sealed with a wad of pus-soaked absorbent tucked tightly into the canal. Often the parents are told to syringe the ear two or three times a day, and keep cotton in the ear between times, and this is the result. Such treatment is entirely unsurgical. These ears should be cleansed at least every two hours when the discharge is profuse, and as much oftener as necessary to keep them clean. Instruct the mother or nurse: first, to put in a few drops of peroxide which will soften the pus; secondly, to syringe the ear thoroughly with a hot solution of boracic acid; thirdly, to instil a few drops of a saturated solution of boric acid in alcohol, then wipe dry.

Much has been written about the so-called dry method of treatment of these ears, *i.e.*, wiping or sucking out the discharge instead of syringing. Doubtless the ideal method would be to cleanse them thoroughly with cotton and then use gentle suction several times a day; but if you can get a mother or even a trained nurse to do this efficiently you are exceptionally fortunate. The use of the syringe is practical and gives results.

Be careful to give detailed instructions about the method of syringing. The auricle is to be drawn upwards and backwards, so as to straighten the canal. The tip of the syringe is to be put well within the canal and in the direction of its axis, then use copious quantities of solution. A soft all-rubber ear-syringe is good, but, better still, use a fountain syringe with a quart of warm solution.

How long shall we continue this treatment, and when should we look for beginning mastoid complication? You may take it as a general rule that, if it is a first attack, you can safely watch an acute otitis for ten days.

Let us suppose we have two cases which have been discharging for the ten-day period under consideration. In the one case the discharge is as profuse as ever, or even more so. Look into the ear, and we see that, after wiping away the discharge, the canal refills rapidly, and when the drum is seen pus pulsates through a small opening. The canal wall is reddened

and swollen, so that the lumen of the canal is encroached upon. There is tenderness over the tip of the mastoid and perhaps over the body of the mastoid. There is a leucocytosis of 12,000 or more, and sometimes fever, but do not put too much stress on its absence.

The other case manifests the opposite of all these conditions. The discharge has gradually become less in quantity and improved in quality. When the ear is cleaned out, it remains clear for a considerable time. There is no pulsating discharge through the drum; the canal walls do not sag and bulge; mastoid tenderness has disappeared, and the white cell count is nearly normal. There is a feeling of well-being in the patient which is absent in the first case.

The first case will probably need a mastoid operation. The second, nine times out of ten, will get well without further trouble. If it does not, how long shall we wait? If all possible care has been given, the ear constantly kept clean, adenoids and tonsils removed, when necessary, and general health cared for, then, if the discharge persists freely, after five or six weeks treatment, it is much better to do a mastoid operation than to go on with a chronic running ear. If properly done, the operation is practically without danger and results are good in every way, whereas a chronically running ear impairs hearing, and is always a menace and a burden.

A word about the acute aural inflammations which arise as complications of the exanthemata or of pneumonia. Often the symptoms are masked and only constant alertness will afford an early diagnosis. The treatment is essentially the same, with the exception that the patient's general condition is of more importance when considering operation.

With a chronic discharging ear one is always, figuratively speaking, sitting on a powder barrel. Acute symptoms are to be considered with utmost seriousness. Pain or distressed feeling in the head, especially if associated with temporary suppression of the discharge; dizziness; the presence of polypi in the canal; a foul discharge with dead bone palpable by an attic probe are all danger signals, and are indications for a radical mastoid operation. In the absence of these

symptoms cleansing is usually all that is required. The point to be remembered and impressed upon our patients is that the development of these chronic affections can be prevented by treatment, with systematic follow-up and control, of all acute cases.

INFECTIONS OF THE NOSE AND THROAT

We cannot to-day be content with making our general examination from the neck down, as we used to do, and simply hope that there is nothing above that disturbing our patient. It is being generally recognized throughout the medical world that a very large proportion of our office patients, the chronically unwell class, are primarily suffering from upper respiratory tract infection. The vast number of people complaining of headache, neuralgias, neurasthenias and migraines; of chronic cough, bronchitis and asthma; of arthritis and so-called chronic rheumatism, are being studied as never before, and, in a large proportion of these cases, the original focus is being traced to infection in the nose and throat. Is this merely a fad, or perhaps a tendency of the medical pendulum to swing to extremes? Let us consider the reasonableness of the proposition. In the nose are two mucosa-lined passages, each connected with a whole series of blind sinuses or cavities, often with inadequate ventilation and drainage. Through this passage, or through the mouth, must go all the air we breathe. Now, under our modern civilization, in a northern winter climate, we take thirty, forty, yes even sixty children, put them in one room for two or more hours at a time, raise the temperature to between seventy and eighty degrees, have the air so dry that it irritates not only the delicate mucous membranes but even the tough skin; add some chalk dust, and then allow half a dozen children with acute coryza to cough germs around promiscuously. Can we wonder that nasal infections are prevalent? Then given a chronic nasal infection, with germ-laden discharge pouring out day and night, some of it being swallowed, some aspirated into the bronchi, the natural sequence seems to be chronic systemic disease and depression.

Nose and throat infections then are important enough to bear in mind when examining any one in chronic ill-health. What are we to

look for, and how can we go about making a diagnosis in the few minutes at the disposal of a busy practitioner? As in other infections, we have to deal with acute and chronic phases.

Acute infections are comparatively simple to diagnose. There is usually a history of cold in the head, which persists, often with pain and tenderness around the eye or brow. A persistent cold in the head, with one-sided nasal discharge, is a definite sign of sinus infection.

If the membranes are much swollen, shrink them by packing the nose lightly with 5 per cent cocaine for five minutes, using thin cotton pads dampened with the solution. This gives better ventilation and drainage. If you have any sort of suction apparatus, apply it several times for short intervals. Next, pack the nostrils with cotton pledgets soaked in 10 per cent argyrol. Tease out a thin layer of cotton on the first joint of your left thumb. Soak thoroughly with argyrol, then, folding one end over an applicator, slide it along the septum to the upper posterior part of the nostril on each side, and leave it there for twenty or thirty minutes. Repeat this treatment daily. These pledgets seem to have an osmotic effect. Copious secretion results so that the patient must be provided with a large gauze handkerchief. There is often spasmodic sneezing and reddening of the eyes, but the patient is greatly relieved and the head feels clearer. This simple treatment will clear up many an acute sinusitis and be helpful to all acute rhinitis cases. It should, of course, be combined with general treatment, such as careful diet, rest, and proper ventilation.

Coming to chronic nasal infections, we have a difficult field which needs all the skill we can possibly acquire, for many cases are overlooked even by men whose special field this is. There are, however, certain basic principles of examination, easily mastered, which will indicate the trouble, if present, in the great majority of cases.

First, as in all diagnosis, the history is of great importance. These patients usually do not complain primarily of nasal symptoms, but rather of those suggesting tuberculosis. There is languor, fatigue, often cough with morning sputum, and bronchitis, sometimes a slight evening rise in temperature. Hoarse-

ness is frequent, and nervous symptoms, such as headache, depression, neuralgia, migraine and neurasthenia are usually present in some degree. In a recent analysis of 100 cases I found that 32 per cent, practically one-third, complained of head-pains of some description. Frontal and occipital pain is most common. There is usually phlegm in the throat and post-nasal dropping, with an occasional bad taste in the mouth, especially in the mornings, but the patient may be so accustomed to this that he is entirely unconscious of it and only questioning will bring out the complaint.

The patient comes then with obscure head-pains or neuralgia, post-nasal discharge and general depression. Sinus infection must be considered. How are we to find out more about it? Under good illumination with a head mirror examine the nostrils and note whether the passages are free or blocked. In a normal nose with fairly straight septum the inferior and middle turbinates hang freely in the nostril and are easily seen. There is ample room for ventilation and drainage. A blocked, obstructed nostril predisposes to sinus infection. Beware, however, of putting too much stress on a curvature in the septum or a spur. Frequently these are innocent of real harm and should be left alone, unless causing symptoms such as real obstruction to breathing, frequent colds with blocking of discharge and pain. The submucous operation for straightening the septum is an invaluable operation when needed, but it is much over-worked.

Next examine the mucous membranes. The normal mucous membrane has a clear, glistening, ruddy appearance, more easily recognized than described, and very different from the boggy, deadened appearance of the membranes so frequently seen in chronic sinus cases. Observe any discharge which is visible, and note if it comes from under or over the middle turbinate. Then, if there is much blocking of the nostrils or swelling of the membranes, pack the nostrils lightly with 5 per cent cocaine for ten minutes. This will, by shrinking, give us a much better view and allow discharge or polypi, formerly invisible, to appear. Suction applied at this stage is also valuable.

Next transilluminate the sinuses. This is a valuable adjunct to diagnosis. It is simple,

quick, easy, and often puts one on the right track. Compare the clearness of the two sides carefully, under different degrees of illumination. Do not forget to remove any upper artificial dentures. Should one antrum appear dark, antrum puncture is of great value in substantiating the diagnosis.

Last, but not least, comes x-ray examination. A good x-ray plate is a wonderful help, but unfortunately much experience and special technique are required on the part of the roentgenologist to make the plates reliable.

When once the diagnosis is established, the treatment is mainly surgical. If the condition is of recent standing, *i.e.*, within a year, usually free intra-nasal drainage is sufficient, whether it be an antral, frontal, ethmoid, or rarer sphenoid infection. In longer standing antral cases, the radical Caldwell-Luc operation is preferable. Only in persistent and severe cases is the radical frontal needed. With properly carried out surgical measures, the results in nearly all these cases are good, and often wonderfully good.

Before leaving the nose, a few words with reference to sinus infection in children are necessary. Sinusitis is much more prevalent in children than is generally realized. It is comparatively easily recognized if looked for. As with adults, the complaints frequently refer to general conditions. There is listlessness, loss of colour and appetite, and undernourishment. On examining the nose the mucous membranes are apt to be found swollen and boggy, and a muco-purulent discharge may be present. A nasal discharge in a child which persists, even after the removal of adenoids and tonsils, is fairly definite evidence of sinus infection.

Little time is left for the consideration of throat infections, but the tonsils must be referred to. Here, also, especially in adults, the history is of as much importance as the examination. Is your patient well? If not, why not? If he has pains in the joints, with poor general health, naturally, evidence of disease in the tonsil is of far more significance than if he were robust. One's tolerance for infection varies as much as his tolerance for whiskey, and it is the individual that we must treat, not the tonsil.

In examining the throat in adults, merely looking at the tonsils by pressing down the

tongue is of little value, though one may get a hint of disease if the anterior pillars are deeply injected. Large fibrous, ugly tonsils are often more innocent of disease than small buried ones. Take a retractor, pull back the anterior pillar and press on the tonsil. A thin milky or purulent discharge indicates the worst type. Large open crypts with white cheesy material often seem to do little harm. If possible, use suction to bring out the character of the discharge. Often one has to rely on general symptoms, rather than local, together with a carefully taken history. I recall two

recent cases in which the tonsils were small with little apparent infection, but the patients each gave a history of periodic prostration and indigestion accompanied by an inflamed throat. We found a large buried abscess in one tonsil in each case. In children the size of the tonsils is important, also any enlargement of the anterior cervical glands.

It is impossible in a paper of this kind adequately to cover even one phase of the subject, but enough has been said to illustrate the practical importance of this work in every practice, and possibly to stimulate interest in it.

INTESTINAL GRIPPE (SO CALLED)

BY FRANK H. BOONE, M.B.

Hamilton, Ont.

SINCE 1918 a term has arisen which is applied both by laity and physicians to certain types of cases. It has been used so generally that one must consider the possibility of the condition designated thereby, which is described throughout the world, and frequently called "intestinal gripe" or "intestinal influenza."

Influenza was epidemic in this country in 1918 and 1919; since then it has been endemic in the colder seasons. During this period of the year we meet the cases that have been classified as intestinal gripe. Most doctors, with whom I have talked, feel that some indefinite condition does occur during this time, which is closely related to influenza, but concerning the actual identity of which they are uncertain. I have discussed this subject with several whose practice is limited to children. All mentioned various patients they had seen with symptoms which they thought might be classified within this group. In some there was severe diarrhoea, with mucus, blood, and even pus. One must of course remember that bacillary dysentery occurs even in the winter months; personally, I recollect having seen proved cases in November, December and January. One paediatrician, whom I know to be a keen observer, went so far as to claim a seasonal incidence for intestinal gripe. During the months from November to January he had seen many patients in welfare clinics who gave the following history: sudden onset,

with violet vomiting, followed by marked anorexia; drowsiness; slight fever; and irritability. Usually there was some diarrhoea. He had observed this every winter for the last four years, and though he did not feel justified in saying that the symptoms were due to influenzal infection, he considered it possible. When reliable men express such ideas, one must hesitate before they are cast aside as purely imaginary.

Definite diagnosis, however, is complicated by the great number of widely different etiological factors able to provoke similar symptoms. It is well known that frozen milk will cause frequent and severe gastro-intestinal disturbances in young children. Parenteral infections of all types are so often attended by intestinal disturbances that in many cases of so-called intestinal gripe, I feel a differential diagnosis would be impossible. Recently the rôle of paranasal-sinus and mastoid infection have been especially emphasized. John Thompson,¹ of Edinburgh, under the heading of parenteral infection, says, "The disturbance of the alimentary canal may be predisposed to by the acquisition of an infective condition in other parts of the body, such as catarrh (influenzal or other) in nasopharynx, ear, bronchi or urinary tract, which so weakens the patient as to set up a food disorder which would not otherwise have arisen."

For many years writers have mentioned gastric and intestinal symptoms in influenza,

both adults and children being affected, but mainly the latter. In many of the text-books, both old and new, the authors have included a gastro-intestinal type, but are not willing to recognize it as a distinct clinical entity. Frederick Lord,² writing in Osler's *Modern Medicine*, classifies influenza under nine headings. Of the gastro-intestinal type he says. "This form of influenza is an entity of uncertain existence. The symptoms referred to this tract may be toxic phenomena, secondary to the respiratory and nervous form." He had never seen a case with absence of the respiratory symptoms in which the diagnosis was certain.

J. A. Lighty,³ during an epidemic of several hundred cases of influenza, was unable to find one case of a typical gastro-intestinal form. In many the abdominal symptoms were so marked, and those in other parts of the body so mild, that one might easily believe them to be the result of infection or some lesion of the gastro-intestinal tract. In none was he able to show this to be a fact. The respiratory symptoms were sooner or later recognized in all. He stated that in autopsies performed at the Mercy Hospital, Pittsburg, none revealed any characteristic lesion which could be attributed to influenza, unless one accepted hyperplasia of the solitary lymph-follicles as such. Dr. Oskar Klotz was quoted as finding no distinct gastro-intestinal lesions in autopsies on cases dying of influenza at the Magee Hospital. This writer also reviewed the article by Lichenstein on Influenza in the American edition of *Nothnagel's Encyclopedia of Practical Medicine*, which describes a pathological condition occasionally found in the gastro-intestinal tract, namely, a hæmorrhagic condition, and swelling of the Peyer's patches and solitary lymph-follicles, but he believed that these could readily be explained as being coincident or secondary, inasmuch as they might be found in the course of any acute infection. He felt it was obvious that the seat of primary infection in influenza was in the respiratory system, and that there were insufficient data to warrant the designation of a gastro-intestinal form. He believed that this form should be regarded rather as a complication or sequela.

In reviewing the current literature, I have found some variation in the types of abdominal and intestinal influenza or gripe described. I feel justified in roughly separating these reports

into two groups; one in which diarrhœa was seldom present; in the other, always present.

D. A. Rice and H. O. Williams⁴ reported ten cases, seen in five families during a mild epidemic of influenza, which they considered as possibly of an abdominal type. The symptoms noted were: marked inflammation of the eyes; abdominal pain referred to the umbilicus; vomiting; and in some cases diarrhœa with considerable collapse. Pain in the muscles of the neck, legs and arms was also a marked feature.

F. Colmes⁵ reported three cases of spastic ileus associated with influenza. The onset was acute, with colic, persistent vomiting, and severe subjective symptoms. In all a diagnosis of intestinal obstruction was made, but unconfirmed at operation. He considered as possible causes: the action of the central nervous system on the intestinal musculature; inflammation produced by pathologically affected mesenteric glands; or possibly absorption of toxin from the intestinal tract.

James Burnett,⁶ of Edinburgh, divided his influenza cases in children into three groups; catarrhal, cerebral and colic. Of the latter he saw six cases, two in each of two families and the remainder isolated. The patients complained of colic pain in the region of the umbilicus, which gradually increased in intensity. On examination, the abdomen was definitely tender in the centre, but peripherally and in the flanks this was not noticed. Vomiting never occurred and the tongue was coated. Partaking of cold fluids increased the pain, but this was not so with hot fluids. There was no diarrhœa, but rather a tendency to constipation. Pain was intermittent, disappearing for long or short intervals, only to return again as severe as before. The temperature remained elevated about one week and gradually fell to normal; never, suddenly. The irritative cough, so typical of influenza, was a constant system.

The following case-history, from my own practice, presents many points of resemblance to those just quoted from the literature.

CASE 1

J. C., male, aged six years; first seen September 28, 1925.

Family history.—Unimportant.

Previous illnesses.—Mumps; measles; occasional attacks of tonsillitis.

Complaints.—Pain and fever of twelve hours' duration.

Present illness.—September 28, 1925. He com-

plained of pain in lower left side of chest. The temperature was 102° F. He was apparently acutely ill and tender on palpation under left costal margin. The throat was acutely inflamed and slightly swollen. There was no nasal discharge; lungs clear.

September 29th. Temperature, 103° F. Slight tenderness under the left costal margin persisted, but there was no acute pain.

September 30th. Temperature, normal. No pain or tenderness noted.

October 1st. Acute pain in the left side of abdomen, later centering around the umbilicus. Temperature, 102° F. The pain was intermittent, colicky in type, and the patient was unable to turn over. There was no nausea, and the bowels were constipated.

Physical Examination.—The patient was apparently acutely ill, suffering from considerable pain, colicky in type. He lay with his legs drawn up and refused to move. The tonsils and pharynx were red and slightly swollen. There was no apparent glandular enlargement. The respiratory movements were limited. General abdominal tenderness and muscular rigidity were noted, most marked in the area of the umbilicus. There was no particular tenderness over the area of the appendix. The remainder of the examination was essentially negative. The urine was normal. The white blood cells were 7,800 per c.mm., with preponderance of polymorphonuclears.

During the afternoon the colic was less severe but the abdominal tenderness was more marked. The colour was poor and the pulse rapid.

Consultation with a surgeon resulted in a tentative diagnosis of acute appendicitis and operation was advised. At the operation the following points were noticed: an acute catarrhal inflammation of the peritoneum and peritoneal glands, and some swelling and inflammation of the appendix.

Following operation, the temperature remained elevated as high as 103° F. and gradually fell to 100° F. by the sixth day. During the first few days the patient appeared toxic, acutely ill, and complained a great deal of abdominal pain. Anorexia was marked. These symptoms gradually subsided, and, except for a small superficial wound-abscess, his progress was uninterrupted.

I have since heard of several patients presenting histories identical with the above. A number were operated on for acute appendicitis. In one instance, one of twins was operated on, and a week later the other twin developed similar symptoms, but recovered without surgical intervention.

In 1925, Gerald Blake⁷ published a case-history of an adult with intestinal influenza, so called. The symptoms were severe chills, sweating, headache, muscular pains, diarrhoea, and elevation of temperature. A blood count showed 4,400 leucocytes per c.mm. There was no evidence of respiratory infection. The author believed that patients with a mild form of this symptom-complex had frequently been seen since 1919. He considered the diarrhoea to be of toxic origin, due to some organism which causes infection of the respiratory tract. He thought it the exception rather than the rule for these patients to show nausea.

A. Uffenheimer,⁸ of Munich, has described a sudden outbreak of alimentary intoxication during February and March. There were sixteen cases with five deaths. The main symptoms were; vomiting, diarrhoea, trembling of the extremities, a cerebral facies, and no elevation of temperature. Cultures from the faeces were negative. One case was in an exclusively breast-fed infant. They occurred coincidently with an epidemic of influenza and the author considered them an intestinal form of this disease.

Alfred Alexander,⁹ of Berlin, in 1918 reported eight hundred cases of influenza. Twenty per cent of these patients had intestinal symptoms. In 1921 he described an epidemic of what he termed intestinal grippé. The symptoms and findings were given in great detail. All had diarrhoea with blood in the stools, and many patients were jaundiced. The duration of the illness varied from three days to several weeks. At autopsy the following pathological findings were noted; marked hyperæmia of the alimentary tract, especially in the œsophagus, stomach, ampulla and descending colon, where there were petechiæ. In one patient, who had icterus, the papilla was markedly thickened and showed a large submucous hæmorrhage. The gall bladder was full, its mucous membrane thickened; the liver was enlarged, and the spleen large and soft.

CASE 2

C. P., a boy aged 9 months, who was first seen on January 18, 1927.

Complaints.—Colic, loose stools, vomiting, fever and fretfulness, of 24 hours' duration.

Family History.—The mother was suffering from what she described as a "head cold."

Past History.—The patient had been breast-fed since birth, with the gradual addition of cereals, green vegetables, and potatoes, from the age of six months. On January 8th, cod-liver oil had been started, and rapidly increased to a teaspoonful twice daily. He had had no previous illness.

Present Illness.—On January 17, 1927, the patient slept longer than usual, and the mother thought he was not well. She reduced the feeding to breast-milk only. After the 6 p.m. feeding he passed a loose watery green stool with considerable mucus, and later vomited twice. During the night he had frequent attacks of colic, and was given two simple enemas, which were returned with undigested food and mucus; no blood. Anorexia was not marked.

Physical Examination.—The temperature was 100° F. The child appeared ill, was fretful, and objected to examination. The tonsils and pharynx were inflamed and slightly swollen. There was a very slight nasal discharge. Otherwise examination was entirely negative.

Impression.—Acute rhinopharyngitis; acute gastrointestinal indigestion.

Feedings were discontinued for twelve hours and

water only given by the mouth. Breast-feeding was gradually resumed. It was however several days before the stools were entirely normal and a regular diet could be resumed.

I have presented these cases, not because I believe them necessarily due to influenzal infection, but to serve as examples of what might be so considered. In the first case I thought there was a true influenzal infection giving very definite abdominal symptoms. In the second there are several possibilities. In the first place, it is possible that the intestinal upset may have been due to the rapid increase in the dose of cod-liver oil. This I feel satisfied does occasionally happen. Secondly, there may have been some parenteral infection, leading to an associated food-disturbance. Thirdly, it is possible that the infection may have been of an influenzal type, with gastro-intestinal symptoms.

SYMPTOMS

From a review of the literature it is apparent that only a few of the symptoms are a constant feature of the disease-complex termed "intestinal gripe." I shall rapidly enumerate those most frequently mentioned.

Pain.—It is probably present in all cases. Most writers mention pains in the muscles of the neck, back and extremities. However, the more severe symptoms are abdominal. Here the pain is colic in type, localizing around the umbilicus, at which point the tenderness on palpation is maximal. It is intermittent, and gradually increases in severity as the illness develops. There are many explanations offered for it. James Burnett⁶ thought it might be due to an affection of the intestinal muscles as influenza is noted for its effect upon muscles. Usually in this disease the patient complains of muscular pains in the chest, shoulders and extremities. It also seems possible that the colic may be merely the result of some irritant within the intestine. Lastly, the findings, at operation, of catarrhal inflammation of the peritoneum and mesenteric lymph-glands suggests an easy explanation for this distressing symptom.

Fever.—In the majority of cases there is some elevation of temperature, ranging as high as 104° or 105° F., in some instances. Occasionally, however, as in the sixteen cases of Uffenheimer,⁸ there is no pyrexia. Personally,

I should feel very doubtful of any case in which there was not at least some slight rise.

Anorexia.—Very little mention has been made of this symptom in the literature. However, after discussing this symptom with several pædiatricians I have gained the general impression that it is marked at the onset of infection and often persists for some time afterwards.

Vomiting.—There is a great difference of opinion in regard to this symptom. Many report it as occurring in all cases, and I believe it to be present in most where there is diarrhoea. One author considered it the exception rather than the rule.

Stools.—All variations from marked constipation to extremely loose, watery movements with blood, mucus, and even pus have been mentioned by various observers. I believe the younger the patients the more liable they are to diarrhoea. Moreover, I believe it a good rule to regard all cases in which blood and pus are accompaniments of a diarrhoea as bacillary dysentery, until proved otherwise.

Jaundice.—Several writers have mentioned this symptom in a number of cases, and one, G. Blake,⁷ directly associated influenza and infectious catarrhal jaundice. At present, it seems very difficult to believe that the cause of these two conditions is the same.

White Blood Cell Count.—This has not been given much prominence. I could find but one instance in which it was mentioned, and there it was quoted as 4,400. If the infection is really influenzal in origin, we should naturally assume that there would be a leucopenia. However, I am not sure that this is constant.

Respiratory Features.—In some of the cases recorded in the literature no positive findings are mentioned; in the majority, however, there has been inflammation of at least the upper respiratory tract. I have not seen any cases in which this was not present.

ETIOLOGY

The etiology is unknown. It is assumed by most writers to be similar to that of the true influenza, because the symptom-complex of intestinal gripe is usually found when this disease is prevalent.

PATHOLOGY

The pathological findings recorded in the literature are as follows: catarrhal inflammation of the peritoneum and mesenteric glands; swelling of Peyer's patches and the solitary lymph follicles; and occasionally hyperemia and swelling of the intestinal mucosa. One or two observers have recorded extensive intestinal hemorrhages.

SUMMARY

1. Influenza is at times attended by such marked intestinal and abdominal symptoms that numerous observers have come to believe in the existence of a gastro-intestinal form of the disease, in which the primary seat of infection is intra-abdominal.

2. This so-called "intestinal gripe" has been more frequently observed in the very young than in the adult.

3. In many instances there has been no obvious involvement of the respiratory tract. Diagnosis has been based on the association with epidemics of influenza, and suggested by the generalized muscular pains.

4. Attention is called to the diagnostic difficulties presented by these cases. Numerous other etiological agents may give rise to similar disease-complexes. Among them bacillary dysentery, frozen milk, and parental infections of all types have been mentioned.

Pseudo or Transient, Arteriosclerosis.—E. Moschowitz, New York, reports the case with autopsy of a man, aged 45, who entered the hospital with a typical acute or subacute glomerulonephritis, with signs of marked impairment of kidney function. As the radial arteries felt much thickened a diagnosis was made of acute glomerulonephritis on the basis of an old arteriosclerosis with chronic nephritis. The disease ran a rapid course, and death occurred in three and a half weeks after admissions. At autopsy, a subacute glomerulonephritis was found with an aorta that did not show any gross evidences of arteriosclerosis. Moschowitz says that in the course of acute glomerulonephritis, the radial vessels afford a sensation of thickening so that the clinical diagnosis of "arteriosclerosis" is often made. If the patient recovers, this feeling of thickening disappears a few weeks after disappearance of the increased intravascular tension associated with the nephritis. This feeling of thickening is the result of two factors: (a) the hypertension itself, and (b) the hypertrophy of the muscular coat consequent to the hypertension. The second factor is the dominant one. When the hypertrophy subsides, the feeling resembling that of arteriosclerosis disappears. In the case here reported, the aorta was found at autopsy to be normal. A recognition of

5. No typical pathological findings have been recorded.

CONCLUSION

There is no evidence as yet sufficient to warrant us in accepting the existence of a gastro-intestinal form of influenza, in which the primary seat of infection is intra-abdominal in origin. If true intra-abdominal infection with the organism of influenza does occur, it is safer to regard it as a complication or sequela of a respiratory infection. Obviously, however, the whole question must remain an open one until there is a more exact knowledge concerning the micro-organism responsible for influenza.

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this phenomenon is highly important for prognosis.—*J. Am. M. Ass.*, May 12, 1928, xc, 1526.

Treatment for Split Finger-Nails.—W. W. Carter, New York, reports the case of a girl, aged 18, who had a split nail on the middle finger of the right hand; the split had reached almost to the root of the nail and had resulted from an injury to the finger six years before. As the nail grew out, the apex of the slit would remain at about the same place. The advised her to let the nail grow about three-eighths inch beyond the end of the finger and then to return for treatment. He then made a drill from a cambrie needle and with this made three opposing holes on each side of the slit. He passed sutures through corresponding holes and drew the edges of the nail as close as possible. The finger was then bandaged for protection. As the nail in growing protruded the distance between two of the stures, the distal end of the nail was pared and another suture placed near the end of the finger. This process was kept up until the apex of the slit was well beyond the end of the finger. A complete cure was effected in six weeks and after the lapse of three years the nail is perfectly normal.—*J. Am. M. Ass.*, May 19, 1928, xc, 1619.

GENERAL ANÆSTHESIA IN OTO-LARYNGOLOGY FROM
THE STANDPOINT OF THE SURGEON*

BY EDMUND BOYD

Toronto

THE purpose of these remarks is to give an idea of some of the mechanical factors which may interfere with the administration of anæsthetics in the more common operations of oto-laryngology, and to suggest ways of dealing with them. A few general statements will be added.

There is no reason why anæsthesia should be different in this branch of surgery. There is, however, an important qualification where the throat surgeon is concerned. He must be particular in having good anæsthesia, because he is working in areas through which breathing takes place, on tissues which are very susceptible, and which vary greatly with the condition of the patient. The safety of the patient, and the quality of the operative work, are in great measure dependent upon the character of the anæsthesia. The danger to the patient and awkwardness to the surgeon caused by imperfect anæsthesia are hardly appreciated by the anæsthetist. A state of unconsciousness, with or without partial asphyxia, may do for an operation on an extremity, but it will never do for an operation on the throat. Congestion of the tissues will make any operation more difficult, because of the excessive bleeding. Too deep anæsthesia may ruin a bronchoscopic or œsophageal procedure. What is needed is good anæsthesia to the surgical degree, no more, no less; anæsthesia into which the patient has been directly induced, in which he has a free airway, breathes regularly and properly, has no undue increase in blood pressure, and his tissues are relaxed and in a state of good tone. There is an art in producing this.

Failures to obtain perfect anæsthesia may be the result of faulty administration. But, a most important cause, and one which is so frequently overlooked, is that of failure to

provide for, and failure to maintain, an adequate airway. Without proper breathing, it is impossible to have proper anæsthesia. The throat surgeon is in a position to recognize as they occur, the various causes, and types of obstruction in the air-way, and should be ready at any time to help in rectifying them.

An obstruction may already exist in the airway, or it may arise during the course of the anæsthetic, from (1) the collection of secretions or blood; (2) relaxation of the tissues; (3) spasm; (4) certain combinations of these factors.

The nose is the natural channel for breathing, and is so used, instinctively, from birth. If at any time, however, the lumen is not sufficient, the individual consciously opens his mouth to make up the deficiency. In the act of going to sleep, when the patient loses consciousness, the mouth closes, and forced breathing takes place through the nose. In this way a state of cumulative asphyxia is set up which, sooner or later, according to the degree of obstruction, awakens the patient. During the induction of an anæsthesia, the same process occurs, except that it is complicated by the anæsthetic, and the individual is prevented from awakening. To continue the anæsthetic under these circumstances is inexcusable. Therefore, in any case of organic nasal obstruction, or when the nose has been packed, it is essential, before beginning, to provide some means of continuing the airway through the mouth. A piece of hard rubber, attached to a string, placed between the teeth at one side, or a mouth gag slightly open, will effect this. Often in infants, and sometimes in certain types of adults, this is not sufficient, because the large and powerful tongue seems to fill the whole mouth and most of the oral larynx. A small, suitably curved airway, placed to reach the lower part of the oral pharynx may be necessary.

In the pharynx there may, occasionally, be large, pendulous tonsils, which are drawn down

* Read at the Academy of Medicine, Toronto, at the joint meeting of the sections of Oto-Laryngology and Anæsthesia, February 13, 1928.

in inspiration, and act as a ball-valve. This may be remedied by holding up one tonsil with a tenaculum forceps.

Saliva may collect in the pharynx, more often at the beginning of the anæsthetic, when the ether induction is slow. It may act in a reflex way, causing partial closure of the glottis, with coincident shallow breathing; or it may collect until there is an actual obstruction. This saliva can be baled out with a tongue depressor, and allowed to run out, by turning the head to one side and depressing the lower side of the mouth and cheek; or, suction may be used. If there is no machine, a reversed rubber syringe will do just as well, but to be of any value, the tip of the suction tube must reach the lower pharynx. The best way, however, is not to allow it to occur. The cause usually lies in faulty administration.

When relaxation sets in, the most common type of obstruction is that caused by the falling back of the tongue into the pharynx. The lower jaw, widely opened by a mouth gag, presses the tongue backwards and makes the condition worse. Some manoeuvre which will hold the tongue forward is necessary, such as, (1) Extension of the head. (2) Holding the lower jaw forward by the chin, or by the angle of the jaw. (The pain afterwards is often bitterly complained of by the patient). (3) Holding the tongue forward by forceps, or by any other means. (This has the same objection as in No. 2). (4) The lower jaw held forward by a twisting action of the mouth gag. (5) By a curved metal airway. (This is not altogether satisfactory, because the curve is not right and there is no lifting action).

None of the above methods may be quite satisfactory. The best way is to lift forward the back of the tongue and epiglottis by a spatula, using the upper incisor teeth or the jaw as a fulcrum. It would be very easy to design such an instrument to include an opening at the mouth, with a handle in loop form to surround the nose. In an emergency, the blade of a metal tongue depressor can be slipped down, and the tongue held forward.

A rare accident when using ethyl chloride is to have the epiglottis drawn down and sucked into the larynx, at the beginning of a forcible inspiration. This needs immediate attention, and can be rectified by running the finger over

the back of the tongue and pulling up the epiglottis.

Partial shutting off of the larynx commonly occurs, and occasionally there is a complete spasm. This is usually caused by forcing the ether when the patient will not tolerate the concentration. If the closure is slight, it may not interfere with the patient going under. It is often brought on by administering an ether mixture too soon. The superfluous vapour is very irritating to the surgeon, and for short operations, this mixture might be dispensed with. If the closure is marked, it is better to stop the anæsthetic until the breathing becomes free and regular, then to gradually work up to concentration.

Secretions allowed to collect in the pharynx may overflow, and be drawn into the larynx and trachea, causing at first a certain amount of spasm of the larynx, and later, will, with the addition of mucus, be churned up in the trachea, and act as an obstruction. There are characteristic sounds associated with this condition, from which it is obvious that the patient is not breathing well. Under these conditions it is dangerous to proceed with the anæsthetic. By intubating with a suction tube, this condition might be relieved, but an easier way, and one which may save time in the end, is to let the patient come out far enough to cough it all up. He will then go under readily.

If stenosis, or obstruction by a foreign body, should exist in the larynx or trachea, to such an extent that any extra exertion brings on cyanosis, it is very dangerous to use anything that will excite the patient, or increase the respiratory exchange in rate or volume. Ethyl chloride and ether should not be used. It is in such cases that the induction of anæsthesia by chloroform, given sparingly and carefully, is of great value; but the administration in these cases should be guided by the surgeon.

Intra-Tracheal Anæsthesia.—This is unquestionably of great use in certain cases. A single tube however, has disadvantages, as a free passage for the return flow must be provided, and it does not prevent secretions or blood from getting into the larynx and trachea. It may, on the contrary, make a nice track for them. The pharynx should be kept clear of any such accumulations. Often the patient is only slightly under, the blood pressure is high, and

bleeding takes place very readily. This is a great disadvantage, especially in a septum operation.

The metal airway, with insufflation tube attached, is a very good substitute. It is simple, easily introduced, provides an airway through the mouth and pharynx, and can be used in many cases with great satisfaction.

Clothing.—It is important to see that the patient is suitably clothed. An excess of covering interferes with the natural and proper elimination of heat, and may be of harm to the patient.

The use of the rubber sheet over the eyes seems unnecessary. Capillary attraction between the rubber and the surface will draw up ether over the eyes. Intense conjunctivitis has sometimes resulted. A careful anaesthetist will never allow an excess of ether to run off the mask.

If the breathing becomes infrequent and shallow, it may be due to a condition of apnoea, following too forcible and rapid breathing, or it may be due to respiratory failure.

If artificial respiration be called for, it is essential to watch for any efforts at breathing, and to help them along, always keeping in the same rhythm. Ill-timed action may stop them entirely.

When the anaesthetist is late in starting, it is not fair to the patient to force the anaesthetic, besides, it usually results in poor anaesthesia, which causes greater delay. When the patient is not in a satisfactory condition, it is not fair to the surgeon to tell him that he may start the operation. If there be any departure from the normal, an analysis of the situation is advisable, so that the trouble may be rectified at once.

In conclusion, may I state that the surgeon should know something about anaesthetics, should know what he wants, and how to get it. And in turn, the anaesthetist should know something of the surgical technique of the throat. I can think of no better preliminary training for an anaesthetist than an internship, or its equivalent, on a throat service. He would get an idea of the anatomy, physiology, and pathology of the breathing passages. He would become familiar with the ordinary manipulations on the throat. He would learn the mechanics and dangers of anaesthetics, how awkward it is to work with poor ones, and how different it is to work with good ones. He would then be in an advantageous position to acquire the art of the perfect anaesthetist.

ANÆSTHESIA IN NOSE AND THROAT SURGERY, FROM THE STANDPOINT OF THE ANÆSTHETIST*

BY SAMUEL JOHNSTON, M.A., M.D., F.A.C.P.

Toronto

THE day has passed when a nose and throat operation is looked upon as a trivial affair. Experience has taught us that a patient about to undergo an operation on these parts, or even on the tonsils alone, must be as carefully prepared as for any major operation. Especially is this true with regard to adult patients, to whom the surgical shock may be as severe as in any so-called "major" operation. This is also the case from the standpoint of the anaesthetist.

The anaesthetist has before him one crucial problem, the safety of the patient, and to this end should co-operate with the surgeon in

administering an anaesthetic with a surgical degree of narcosis and necessary muscular relaxation. There is no branch of medicine in which personality counts so much as in anaesthesia. This applies not only to the anaesthetist's attitude to the patient, but also in his dealings with the surgeon, physician, or any one with whom he is working. He should be possessed of a mind open to any valuable suggestion offered, or to fair criticism made, without feeling any resentment.

Previous medication for adults is an important factor in nose and throat anaesthesia, unless of course, there is some contra-indication to its use. I have found it of great assistance, especially with nervous patients. Morphine $\frac{1}{4}$ gr., with atropine $\frac{1}{150}$ gr. or $\frac{1}{200}$ gr. ad-

* Read before the combined Sections of Otolaryngology and Anaesthesia, Academy of Medicine, Toronto, February 13, 1928.

ministered one-half hour before operation, or morphine $\frac{1}{4}$ gr., atropine 1/150 gr., hyosine 1/200 gr., administered three-quarters of an hour previous to operation, meet the requirements of most cases.

The induction of anæsthesia is much the same for all types of surgery. Most anæsthetists induce anæsthesia with ethyl-chloride and sustain this with ether. Some use ether or a mixture of chloroform and ether; while others use nitrous oxide and oxygen for induction. There are some cases in which nitrous oxide and oxygen should be given throughout, as diabetes, pulmonary tuberculosis or acidosis. It is not the most satisfactory anæsthetic for routine work, though it is used considerably in some clinics. The most important points to be considered in the use of nitrous oxide and oxygen are the skill of the anæsthetist and the complete co-operation of the surgeon. However, unless contra-indicated, the ideal anæsthetic for sustaining narcosis in nose and throat surgery would seem to be ether.

While one should never allow himself to be hurried in the induction of anæsthesia, one finds that the more quickly he can get a patient into the surgical stage of anæsthesia, with safety and comfort, the better will be the type of anæsthesia. This is specially important in nose and throat operations for the following reason; the longer you take to anæsthetize your patient, the more saturated all the tissues of the body become, and the reflexes will be correspondingly slow to return, whereas, the cough reflex should return as soon as the operation is completed. If the patient is saturated, he may inspire some of the blood and mucus, laden with all kinds of bacteria from the nasal and buccal tracts, and the results may be disastrous, as exemplified in lung abscess or pneumonia.

Once surgical anæsthesia has been established, the insufflation and suction method is generally used. Care should be taken to keep the suction tip as near the median line as possible, as it is very annoying to the surgeon to have it continually in his way. Another thing to be avoided is the uvula; if the suction tip comes in contact with the uvula, it quickly produces oedema.

Insufflation anæsthesia is best accomplished by passing a catheter through the nose to the

nasopharynx. Care should be taken not to have too great pressure, as blood may be forced into the trachea. In nasal operations, where the insufflation method is employed, a metal mouth airway is used, to which the insufflation tube is attached.

Many nasal operations are better done with intra-tracheal anæsthesia. Here, some experience is necessary before the catheter can be passed with ease. Complete relaxation must precede this method or difficulty on account of spasm will be experienced in introducing the laryngoscope. A double catheter may be used with advantage, attaching the insufflation tube to one and leaving the other for expiration. When the two tubes are used, it is advisable to pack some gauze down around these tubes, to prevent any possibility of blood or mucus entering the trachea. The second tube tends to make intra-tracheal work much safer. It is better to have the exhaust tube a size larger than the insufflation tube. This second tube has another advantage in prolonged operations, as a long rubber tube can be attached to it and thus the ether is carried completely away from the field of operation. In this way, the surgeon is not hampered by the ether being blown into his face. McGill, of London, has devised a tube which consists of two separate tubes joined together about two inches from the distal end, the supply tube extending an inch further than the exhaust tube. This has an advantage over the two single tubes, as often, after one tube is passed into the trachea, a spasm is caused which makes the introduction of a second tube difficult and sometimes impossible. One must keep in mind, however, the dangers of the intra-tracheal method. Experience has shown that a slight degree of positive pressure is not dangerous, but high or long-continued pressure may result in serious reflex disturbances in the lungs, and deleterious effects upon the circulation, depending upon the reserve power of the right ventricle. Positive pressure sometimes produces numerous disturbances in normal circulation in the lungs, such as reflex compression of the lung capillaries. (Sauerbruch.)

In bronchoscopic work, difficulty is sometimes encountered in sustaining smooth inhalation anæsthesia. When the bronchoscope is in position, an insufflation tube cannot be passed,

owing to obstruction of the view, so that a straight metal tube must be resorted to, which is attached to the insufflation tube and the current of air is directed into this tube. Although this is quite easy to accomplish for short operations, it is much better in prolonged cases, such as when searching for a foreign body, to induce and sustain anaesthesia *per rectum*.

It is impossible for a surgeon to do good work in nose and throat operations, unless the anaesthetist is able to maintain complete relaxation of the muscles of the throat during operation. This also lessens the danger of hæmorrhage. In this type of operation, the narcosis should be of such a degree that the palate and faucial arches are flaccid and there should be no reflex spasms of the pharynx. In order to obtain this, one must have free ventilation of the lungs from start to finish. One must recognize what free breathing is. Too often the anaesthetist is satisfied if the patient is snoring or making a noise with each respiration, or if the colour is fairly good. This is not sufficient. One must have a perfectly free airway with the colour better than normal. If this care is not taken, one may have saliva and mucus, and, gravest of all, partial asphyxiation instead of anaesthesia.

Having regard to the essentials of anaesthesia in nose and throat surgery, we now come to a few minor details. The patient can be placed in almost any position convenient for the surgeon, though the present day consensus of opinion is, that the recumbent position is the most desirable. It is essential that the patient should be made comfortable previous to the

administration of the anaesthetic, allowing him to go to sleep in any desired position. It is an easy matter to re-arrange this after he is anaesthetized.

On the completion of the operation, the patient should be placed on his side, so that if there is any oozing, it will drain from the angle of the mouth. Also in this position, the tongue is not so likely to fall back and obstruct the breathing. Another thing, a patient should not be allowed to leave the operating room with damp clothing; and some competent person should remain constantly with him until consciousness has returned.

After nasal operations where there is packing in the nose, either a mouth-gag or metal airway should always be placed in position until the patient has recovered sufficiently to breathe naturally. Personally, I prefer the airway, as it prevents the falling back of the tongue and lessens the danger of injury to the teeth.

In conclusion, may I say that, though anaesthesia has travelled a long, hard road since Voltaire said, "A physician is one who pours a drug of which he knows little into a body of which he knows less," we do feel encouraged to go on in the light of present day achievements in this art. Its future development can only be left to the imagination when we take into account the vast amount of research work being done along this line. It would seem that the age of "blunder and luck" has passed away forever, and we have reached the goal of safe anaesthesia for surgery.

Endometrial Tumours in Abdominal Scars.—Endometriosis occurs in abdominal scars by direct transplantation of endometrial cells, which after a varying latent period form small tumours in this new habitat. The frequent occurrence of these lesions after uterine suspension or fixation of various types suggests the advisability of care in using traction sutures perforating the uterine wall as a method of elevating the uterus, and of protecting as thoroughly as possible the wound edges and peritoneal surfaces when the uterus is incised or punctured by instruments. Even salpingectomy with resection of a wedge of uterine muscle at the cornua may scatter viable endometrial cells which may become implants. Implantation endometriosis in cesarean wound scars is remarkably rare and suggests lower viability and a slighter tendency toward growth in the endometrial cells during pregnancy than during the non-pregnant state.—Marion Douglas, *J. Am. M. Ass.*, June 9, 1928.

Menstruation and Menstrual Disorders.—Emil Novak, Baltimore, urges caution in the therapeutic application to human patients of the results recently obtained through studies in animals, valuable as these studies have been. His own results with folliculin therapy have left him doubtful of its efficacy, and this seems to have been the experience of others as well. In cases of hypofunction of the ovary, particularly in amenorrhœa, it would be surprising if follicle injections in themselves were successful in restoring menstruation. It is much more rational to mimic what is believed to be the normal sequence of events, and to give a series of injections of follicle substance, followed by a series of injections of lipoid-containing corpus luteum extract. Novak's only encouraging results have been with this plan of treatment, which he believes to be far more rational than the injection of either follicle substance alone or corpus luteum extract alone.—*J. Am. M. Ass.*, Feb., 4, 1928.

A NOTE ON THE OUTBREAK OF RABIES IN THE KINGSTON DISTRICT

By W. D. HAY, M.A., M.D.,

Assistant Professor of Pathology, Queen's University, Kingston

IN the June number (1928) of the *Public Health Journal* Drs. Seymour and Bell gave a brief review of the rabies situation in Canada. The Dominion was entirely free of the disease from 1917 to the fall of 1925 when at the close of the hunting season it appeared first in the Ottawa district. During 1926, cases occurred in the counties of Russell, Dundas, Lanark, Renfrew, Grenville and Leeds. Then, another outbreak of the disease took place in the Sharbot Lake district in the northern part of the County of Frontenac, in the autumn of 1927.

On February 12, 1928, a farmer in the Perth Road neighbourhood, thirty miles north of Kingston, reported to the Veterinary Inspector that a strange dog had appeared in the vicinity, and that it was roaming from place to place fighting with every dog it encountered. The dog was shot and the head was sent to the Kingston Branch Laboratory where the brain was found to contain numerous Negri bodies. It is of interest to note that the dog had broken most of its teeth during its period of madness.

The Federal Inspectors investigated the case but they were unable to find the owner until a month later when several contacts had died of rabies. Although no mad dog was known to have entered the City of Kingston, three animals developed symptoms of rabies on the 14th and 15th of March. One was proved to be positive on laboratory examination. The second left the city and killed a number of sheep on a farm about five miles west of Kingston. One sheep which was lacerated about the head developed rabies a month later and its brain was found to contain numerous Negri bodies. The third dog showed symptoms of the dumb type of the disease. It died, and was destroyed without laboratory examination.

The Veterinary Inspectors at once proceeded to induce the various township authorities concerned to pass quarantine regulations. The co-operation of the Kingston police soon checked the spread of the disease in the city, though several dogs developed symptoms of rabies

during April, and two were proved rabid by laboratory examination. The conditions, however, were not so satisfactory in the country districts. The quarantine regulations were passed by the various township councils, but, it was difficult to enforce them. The Federal Inspectors did their utmost to get the co-operation of the people, but it was not until the outbreak became really serious that they received the necessary assistance.

One child was badly bitten on the face by a dog which was proved rabid by microscopic examination. Treatment was begun four days afterwards. Twenty-one doses of vaccine were given and the child remained well. About the middle of April the disease appeared in a number of herds of cattle. Several farmers lost heavily in this way. The head of one animal from each herd was sent in for laboratory examination, and in five cases they proved positive.

One interesting example of the way by which dogs spread the disease may be given. A collie from the Kingston district entered the town of Napanee one evening. A lively fight occurred on the street, and a month later seven dogs died of rabies; four of them came from residences within a hundred yards of where the fight took place.

The important points about the epidemic were: first, that the disease gained widespread distribution before the co-operation of the public was enlisted sufficiently to have the dogs effectively tied up. No case of hydrophobia occurred in the human subject. This was probably in large part due to the efficient use of vaccine, prepared according to the Semple method by the Connaught Laboratories and distributed free by the Ontario Department of Health. Fifty persons who had been bitten, or had been in contact with rabid animals, received treatment at the Kingston General Hospital. No severe reactions followed the use of the vaccine, though a few individuals complained of slight malaise and urticaria between the seventh and tenth days after the commencement of the treatment.

Case Reports

CASE OF SPONTANEOUS RUPTURE OF THE HEART*

BY JAMES MILLER, M.D., D.Sc.,

Kingston

Cases of rupture of the heart with consequent hæmopericardium are by no means common. They may be divided as regards their causation into traumatic and spontaneous. The former are the more frequent, and are due to penetrating wounds by knife or bullet, or to crushing of the chest. In the former the injury to the heart may be anywhere; in the latter it is usually a tear in one of the auricles.

Spontaneous rupture may be due to various causes. Very rarely, it may occur in a practically healthy heart. We have seen it as a result of overdistension in sudden, violent exertion, and also during the administration of an anæsthetic. In both instances it was the right auricle which gave way. In most cases, however, the heart muscle is the seat of some gross pathological change. The commonest of these pathological conditions is degeneration, the result of obstruction to the lumen of the coronary artery. Usually the coronary artery is the seat of atheroma with narrowing of the lumen and thrombosis on a diseased patch. Only in very rare instances is the obstruction due to embolism. The degenerative changes which occur are fatty degeneration, necrosis and fibrosis, occasionally complicated by an aneurysm of the heart, rupture occurring in the sac of the aneurysm.

In virtue of the fact that it is the anterior descending branch of the left coronary which is most commonly the seat of atheromatous disease, the rupture is usually found in the distribution of this artery, *i.e.*, on the anterior wall of the left ventricle near the apex. It is also in the area supplied by this vessel that aneurysms of the heart wall are usually found. We have seen one case in which the rupture occurred in the posterior wall of the left ventricle, *i.e.*, in the area supplied by the

posterior descending branch of the left coronary.

Less frequent, as a cause of rupture, is acute inflammatory disease of the myocardium. We have seen it as the result of an embolic abscess in the wall of the left ventricle, in a case of acute osteomyelitis in a child.

Lastly, as a cause of spontaneous rupture, there is fatty infiltration of the heart wall. In such a case the rupture is found in the anterior wall of the right ventricle. Robert Muir figures such a heart in his text-book (p. 262) and the undernoted case is probably due to the same cause.

CASE

The case was that of a woman, aged 77, who was admitted to the Kingston General Hospital on October 3, 1927. She had always been well until two years previously, when she had a stroke. After this her right side was crippled, and she had a good deal of difficulty in getting about. Three days before admission she had complained of severe pain over the stomach and in the left hypochondrium.

Examination at the time of her entrance to hospital showed some irregularity in the action of the heart due to extra systoles. The heart was slightly enlarged, the apex beat being in the fifth interspace, $4\frac{1}{2}$ inches from the mid-sternal line. The pulse was 88; and the blood pressure, 160 systolic, 80 diastolic. The vessels throughout were thickened. Pain was still present at the time of admission and there were two subsequent anginal attacks; the first on December 14, 1927, the second on the day of her death.

At four p.m., on February 28, 1928, the patient was seized with intense agonizing pain in the region of the upper epigastrium. She became restless, cyanosed and faint. There was vomiting, and the pulse was feeble, rapid and irregular. In spite of treatment, she sank into unconsciousness and died at 8 p.m. on the day of the attack.

The case, clinically, was thus one of arteriosclerosis and cerebral hæmorrhage, exhibiting

* From the Departments of Medicine and Pathology, Queen's University, Kingston.

a series of heart-seizures diagnosed as due to blocking of branches of the coronary artery.

The post-mortem examination was performed the morning after the patient's death, and showed the following:

The pericardial sac was filled with fluid and clotted blood. A small ragged tear was present in the anterior wall of the right ventricle near the apex and close to the interventricular septum. (Fig. 1).



FIG. 1.—View of the heart lying on its posterior aspect, taken from the right. The wall of the right ventricle is loaded with fat. An oblique incision has been made through the muscle and below this is the ragged tear to which the arrow points.

The heart weighed 450 grm. All the cavities were dilated and contained blood clot. The wall of the right ventricle was loaded with fat and showed, microscopically, penetration of the adipose tissue between the bundles of the muscle fibres. (Fig. 2).

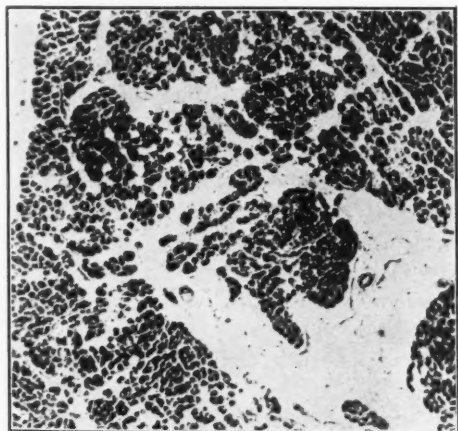


FIG. 2.—Low-power view of the wall of the right ventricle, showing bundles of muscle fibres broken up by infiltration with fatty tissue.

The left ventricle contained a recent thrombus attached to the interventricular septum near the apex. The muscle had a mottled appearance, and showed, microscopically, large fibrous scars, with bundles of muscle fibres in a state of fatty degeneration and necrosis. (Fig. 3).

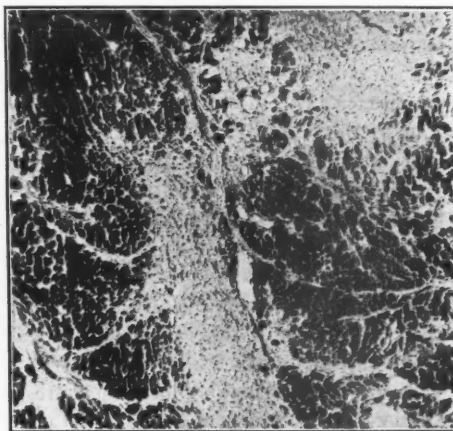


FIG. 3.—Low-power view of the wall of the left ventricle, with fibrous scars (pale areas) and bundles of muscle fibres showing fatty degeneration and necrosis.

The mitral and aortic valves manifested a condition of chronic endocarditis.

The coronary arteries were thickened throughout, and the anterior descending branch showed a thrombus blocking its lumen. Microscopically, there was thickening of the intima, with fatty change and fibrillation of the internal elastic lamina.

There was dropsy of both pleural sacs, and partial collapse of the lungs, which showed evidence of old healed tuberculosis.

The liver, spleen and kidneys showed chronic venous congestion. There was a small parovarian cyst on the right broad ligament, and the gall bladder contained a small mulberry stone.

COMMENT

We have, then, a case of arteriosclerosis with a history of a cerebral hæmorrhage, developing a series of heart attacks, associated with pain in the epigastrium, in one of which the patient dies. Blood is found in the pericardial sac, and a small tear is present in the anterior wall of the right ventricle. The heart muscle in the near neighbourhood shows fatty infiltra-

tion, so that it may be assumed that the rupture was due to this somewhat rare cause. There were, in addition, obstruction to the descending branch of the left coronary, and fatty degeneration, necrosis and fibrosis of the muscle of the left ventricle. Thus, all the conditions were present which usually accompany rupture of the left ventricle, and the curious thing was that the heart did not burst at this point. The actual point of rupture was an area of muscle weakened by invasion with adipose tissue. The violent and irregular contractions of the muscular organ, accompanying blocking of a large branch of the artery of supply, no doubt precipitated the rupture at the weakest point, *viz.*, the anterior wall of the right ventricle.

The case emphasizes the ease with which cardiac pain may be mistaken for gastric pain, especially when, as in this instance, the pain was accompanied by vomiting. We have seen in a case of the kind a diagnosis of acute indigestion made, and death put down to this cause.

DIABETES, ARTERIOSCLEROSIS, AND GANGRENE*

BY EDWARD H. MASON, M.D.,
Assistant Professor of Medicine,
McGill University,
Montreal

At this time it seems appropriate to bring before the members of the profession, and especially before the surgeons, the results that are being obtained in the treatment of the gangrene which so frequently occurs in diabetics. Formerly, the occurrence of gangrene in the diabetic resulted in surgical interference of a radical nature in a large percentage of the cases. Today, the possibility of avoiding such interference is much greater.

During the past two years, twenty-four cases of diabetes mellitus with gangrene have been admitted to the Metabolism Clinic of the Royal Victoria Hospital. Two of these cases died within a few hours of admission. Of the remaining twenty-two cases, fourteen had extensive gangrene of one foot, while in eight the gangrene was confined to one or more toes. In five

of the fourteen cases that had gangrene of a foot complete cure of the gangrene was obtained by medical means alone, the remaining nine having amputations. Of the eight cases that had gangrene of one or more toes a complete cure without surgical interference was effected in five, while the other three had a local amputation only of the toe affected.

In this small series 36 per cent, therefore, were cured without surgical interference when the gangrene involved the foot; and 63 per cent were likewise cured when the gangrene involved one or more toes only.

These results I consider to be representative of what can be done with gangrene in the diabetic, and indicate the conservative attitude that the profession should adopt in dealing with such cases.

CASE REPORT

The present case is that of a woman of sixty-one years who was primarily admitted to the Royal Victoria Hospital on February 2, 1927. Three months before admission when cutting a callus on the sole of the *right* foot blood was drawn. Shortly, swelling and pain in the part appeared. Gradually the swelling involved the whole foot as well as the lower third of the leg. In a few days the whole limb was reddened, warm, and tense.

Upon admission, there was a discharging ulcer on the plantar surface of the foot, and the cellular planes were extensively infiltrated with pus. Lymphangitis extended well up the leg. An incision was made, and through and through drainage established. Examination of the urine revealed marked glycosuria, a finding previously unknown to the patient. With the administration of insulin the blood sugar rapidly fell to normal, and the spreading infection became arrested (see Table I). Subsequently it was necessary to establish more complete drainage, but the foot healed progressively.

This involvement of the right foot was not true gangrene, but extensive infection. Since palpable arterial pulsation was present in the foot I was optimistic from the onset as to the outcome.

Leaving the hospital in April, 1927, our patient continued to follow her diet and take her necessary forty-four units of insulin per day until August. Then for financial reasons she

* Presented at a meeting of the Montreal Medico-Chirurgical Society, March 16, 1928.

TABLE I.—DIABETES MELLITUS WITH GANGRENE

Mrs. J. A., Age 60.

Date	Diet			Urine Sugar	Blood Sugar		Insulin	Remarks
	Protein	Fat	C.H.O.		Fasting	Digestion		
1927	gram.	gram.	gram.	gram.	per cent	per cent	units	
Feb. 2nd		Softs		+++	.....	.....	0	<i>First Admission</i>
" 5th	56	95	56	+	0.300	0.326	20	Surgical:—Gangrene of right foot.
" 6th	28	47	28	0	0.113	.....	45	Incision and drainage (1)
" 7th	19	32	19	0	0.096	0.069	35	Incision and drainage (2)
April 16th	60	180	70	0	0.186	0.112	44	Discharged.
1928								<i>Second Admission</i>
Jan. 22nd	One meal only			+++	.....	.....	..	Gangrene of left foot.
" 23rd	36	113	39	5.7	0.268	0.079	35	
" 24th	30	90	35	0	.....	0.095	20	
" 25th	60	120	50	0	0.120	0.083	31	Incision and drainage.
Mar. 12th	60	180	70	0	0.142	0.148	36	

was forced to discontinue the insulin. The diet was continued.

At Christmas time prickling sensations developed in the sole of the *left* foot. A gangrenous patch rapidly developed upon its plantar surface, and the second toe became discoloured. When admitted on January 22, 1928, the whole foot was swollen and there was a purulent discharge from the large gangrenous patch upon its plantar surface. The second toe was almost black, and the inflammation extended well up the leg.



Plantar surface of the left foot, showing large gangrenous area which healed progressively by medical treatment. (Photo on February 12, 1928).

Examination indicated that the circulation of this leg was much impaired. No palpable pulsation in the foot could be felt, and an x-ray showed rather extensive calcification of the arteries, both in the leg and in the foot. The findings were so formidable that the surgeon in consultation advised immediate amputation. (See photograph).

With strict control of the hyperglycemia and glycosuria immediate improvement followed. This improvement has continued progressively until the plantar gangrenous area was almost replaced by healthy granulation tissue and the dead toe ready to drop off.

TREATMENT

In the treatment employed, rest and warmth, with strict control of the diabetic condition through diet and insulin, were regarded as essential. Patience and persistence came next. Moist dressings should be avoided in all cases of diabetic gangrene. As accessories we have used passive daily elevation and lowering, and in some cases voluntary exercise. Ultra-violet light, both general and local exposures, have also been employed, but we do not consider that these accessories were of fundamental importance in the results obtained. That healing and the formation of granulation tissue must depend upon the development of collateral circulation would seem evident. That such compensatory circulation can develop with time, even when the larger vessels of the leg and foot show marked calcification, is the lesson to be remembered from our experience of the past two years.

A CASE OF CHORIOEPITHELIOMA*

BY ELEANOR PERCIVAL, M.D.

Montreal

Mrs. McK., aged 34, was admitted to the gynaecological service of the Montreal General Hospital on July 6, 1926, complaining of vaginal bleeding which had continued for ten weeks. Her previous menstruation had been normal. She had been pregnant five times, the first, middle and fifth pregnancies ending in abortion between the third and the fifth months. The last miscarriage occurred at five months, in December, 1925. Following this, she had amenorrhœa, until the bleeding which caused her to seek advice began in May, 1926.

On admission, the uterus was found to be the size of a three months' pregnancy, and characteristic small, white, cystic masses were noted in the bloody discharge. Under anaesthesia, the uterus was explored with the finger and a cupful of small cysts removed. Pathological sections showed a benign hydatid mole.

The patient menstruated normally in July, but on August 16th, bleeding recurred, and continued until her re-admission on September 13, 1926. A curettage done two days later showed the uterus to be three inches deep, and with the curette a small amount of normal endometrium was obtained. Three weeks after this, bleeding began again, but this time it was much more profuse than formerly. She was re-admitted on November 29, 1926, and a hysterectomy performed. Sections of the uterus showed no abnormal tissue.

From this time on, the patient gradually failed, losing thirty-three pounds during the following nine months. In September, 1927, she was admitted for the fourth time, complaining of vomiting, palpitation, pain in the right lower quadrant, and sleeplessness. Examination showed a markedly dilated heart, normal chest, the liver enlarged to three fingers-breadths below the costal margin, and the pelvis filled by large cystic masses which were movable and about the size of two large oranges. The pelvic mass did not suggest malignancy, nor were there any nodules palpable in the vagina. The patient gradually failed and died on September 22, 1927.

* From the Gynaecological and Pathological Services of the Montreal General Hospital.

At autopsy, hæmorrhagic, friable masses were found in the liver, which was greatly enlarged, also on the right anterior chest wall, at the base of each lung, on the mucosal surface of the jejunum, and in the pancreas. The pelvis and vagina were clear of these hæmorrhagic masses, but two large benign multilocular cysts were present.

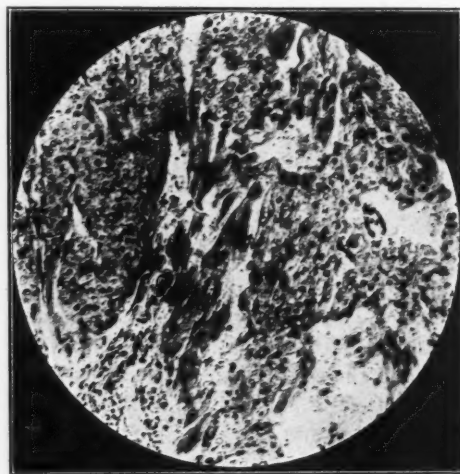


FIG. 1.—Section from metastatic growth in liver showing the two types of cells.

Microscopically (Fig. 1), the tumour masses were made up almost entirely of broad, irregular, anastomosing strands of the two types of chorionic epithelium. The Langhans' cells were distinguished by their smaller, more regular form, with clear protoplasm and fairly sharp cell outline; while the syncytial material formed solid areas, which stained more deeply and in which numerous nuclei were embedded. The cells grow diffusely with no orderly arrangement. The stroma and newly-formed blood vessels were inconspicuous. In one section, tumour material was seen within the lumen of a vein. (Fig. 2). No villi were seen in any of the sections. In the Langhans' cells, mitotic figures could be seen, and it will be noted that the Langhans' cells were not sheathed everywhere by syncytium as in the normal placenta.

The tumour was, therefore, a rapidly growing malignant one, developing from the epithelial elements of young placental tissue—a "chorio-epithelioma". A ripe placenta, *i.e.*, one with mature villi, never becomes malignant.

COMMENT

Chorioepithelioma may follow hydatid mole, abortion, or pregnancy. About 8 per cent of all hydatid moles undergo malignant degeneration, but a history of a mole is given in about 50 per cent of cases of chorioepithelioma. Women who have had five or more pregnancies are most susceptible to the growth. The average age incidence is 33 years.

The tumour was first clearly understood and accurately described by Marchand in 1895. He identified it as being derived from both the

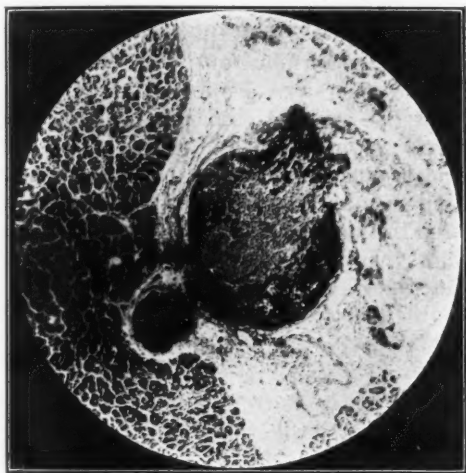


FIG. 2.—Section from the pancreas showing tumour in a vein.

Langhans' and syncytial layers of the placenta, and traced its etiological relationship to the hydatid mole.

Marchand describes two separate types of tumour. The first is the typical form, which tends to imitate the trophoblast of the early months. This is a very malignant type that tends to metastasize widely, dissemination occurring by the blood stream. Our case is a good example of this "typical" chorioepithelioma. The second variety is the atypical one, in which the Langhans' cells are less numerous, and syncytial masses fewer, but there is a diffuse infiltration of the maternal tissues with chorionic wandering cells. The tumour is not nearly so malignant; cures from curettage and hysterectomy are on record.

Normally, both the Langhans' and syncytial layers have a tendency to grow outward into the spaces between the villi. The syncytial covering becomes heaped up, forming polypoid processes, which may break off, lie free in the intervillous spaces, or even enter the blood stream and be carried to distant organs. However, once pregnancy is over these cells rapidly disappear. In chorioepithelioma, on the other hand, the normal destruction of these cells does not occur. Hence, as in the case cited, the uterine tumour may be very small or even entirely expelled with the placenta, while widespread metastases are present.

Nitrites for Seasickness.—Drs. J. Frank Percy and Daniel B. Hayden announced that doses of from 0.2 to 0.3 gm. (3 to 5 grains) of sodium nitrite every two hours relieved eight persons of such symptoms as ocular nystagmus, vertigo, ataxia and nausea within four hours. Moreover, the patients did not suffer any recurrence of the symptoms. Now further support for this method comes in a note by Dr. A. Sellheim of Leningrad to the *British Medical Journal*. He found that a single drop dose of a 1 per cent solution of glyceryl trinitrate (nitroglycerin)—which has the physiological action of nitrites—kept one patient from turning sick. Another person who was sick was able to take dinner twenty minutes after swallowing 0.65 mg. daily. Other patients were protected from seasickness or cured of it by one dose of two drops of a 0.5 per cent solution placed directly on the tongue. Here apparently is a method independently developed in two widely separated places. The clinical evidence seems perhaps less empiric than for many of

the remedies for seasickness heretofore available—*J. Am. M. Ass.*, April 28, 1928.

"I say, without the slightest fear that I may be overstating my case, that there is no profession which is more exposed to the temptation to forget honour, humanity, and kindness than the medical profession, and none in which the exploitation of human suffering is easier. Yet there is none in which the temptation is so triumphantly withstood. Let this be remembered by the public when they feel inclined to sneer at medical etiquette and to speak of it as if it were a code for maintaining selfishness and enrichment. Medical etiquette is the salvation of the patient. It is the one thing which stands between him and the dangers of exploitation. It is what makes him and his sufferings hold the dominant part in the dread dramas of pathology."—John St. Loe Strachey, *The River of Life*.

Editorial

OF THE MAKING OF BOOKS THERE IS NO END

ONE of the pressing problems facing the scientific world of to-day is that involved in the extraordinary number of scientific publications issued annually. The vast majority of these are papers or short contributions giving the results of investigations in the various fields of science, including medicine, pathology, bacteriology, physiology and biochemistry, in which the annual output is ever on the increase. This ever-increasing output is not the same in all departments, but in all during the last fifteen years it has very greatly exceeded the annual rate of increase in each of the preceding twenty years, when the total number of papers published was not more than a few thousands in all lines.

What it is now may be inferred from an estimate of the number of scientific journals annually published, made by Dr. Jocelyn F. Thorpe and given in his address as President of the Chemical Section of the British Association at the meeting in Oxford in 1926. This estimate was 23,000. If in each subject on the average ten papers, a conservative estimate, appear, then more than 200,000 scientific papers are published annually. What this signifies concretely for chemistry is indicated in Dr. Thorpe's statement that to the joint library, in Burlington House, of the Chemical Societies of England, 800 volumes of chemical journals are now added annually. "The mind is appalled at the prospect," he says, "that will confront civilization in a century from now, unless some general method of curtailment of publication is adopted and observed. The space occupied by our ever-increasing libraries will rival that of the cemeteries which threaten to cover the earth eventually. The cemetery problem can be solved by cremation. Is it too much to hope that a judicious exercise of cremation may also be applied to our libraries?"

In medicine and the allied sciences the publication problem is as threatening as it is in the other sciences. Even to-day the

number of papers published annually in medical journals is so large as to defy even approximate estimation, but it is certainly well up in the thousands. Indeed, on insulin alone, according to a statement made last year at a meeting of German pharmacologists, more than 5,000 have appeared since 1924.

That this enormous output is excessive is admitted generally. Professor Frederick von Müller, the eminent clinician, two years ago severely criticized the editors of the German medical journals, charging them with publishing anything and everything that was offered in the form of contributions, whether or not these were worthy of appearing in print, thus loading the record with a vast mass of inferior stuff.

Where is this all to round up? Will these myriads of papers be read, noted and referred to ten years from now? Or will they be remembered like "the snows of yester year?" To give attention in the years to come to a multitude, perhaps thousands, of papers on a single more or less limited subject will result in the breeding of scientific book worms, specialists who "know more and more about less and less", and whose influence on the general trend of knowledge in the sciences, in which they are enlisted, will tend to have an ever decreasing effect.

One of the most influential factors in the promotion of this enormous output of publication, so far as America is concerned, is the status accorded in the universities to members of the staffs based on the number of their publications each year. It would appear that no junior teacher has any chance of promotion who does not publish at least one scientific paper a year, and promotion is assured for one who has many papers to his credit, whether they be important or trivial in value. In consequence, there is an ever increasing tendency amongst the younger generation of scientific workers to multiply their papers by publishing the results of a single investigation of a subject

in a number of separate contributions, each with the same title, but labelled separately by the numerals I, II, III, IV, and so on. It is not only junior scientific workers who are prone to multiply in this and other fashions the number of their publications. It is disturbing to read in a recent eulogy of a senior scientific worker that he has published more than two hundred papers! If every scientific worker aimed at publishing one hundred papers the result would be appalling in a few years.

The old saying, "Of the making of books there is no end," was expressed when all the written word was in the form of manuscript, and manuscripts were countless in the libraries of the ancient world. The Arabs in the eighth century burnt the library at

Alexandria; the Moslems did the same in the fifteenth century for the library at Constantinople; and the Goths, Vandals and Huns played a like part in their invasions of Italy before the sixth century. In consequence, of the ancient Greek literature not more than ten per cent has survived. Much that was of inestimable value and much that was worthless have thus gone into oblivion. We cannot hope, even if we were so minded, to have hordes of barbarians invade our Western world and, thus, in their rude fashion, solve our menacing library problems.

How about a League of Nations' Committee to suggest a code of ethics which will impose a severe circumspection regarding publication in science?

A. B. MACALLUM

THE NEW WORSHIP OF THE SUN

THE sun has at all times and in all climes been an object of veneration. Indra, Ammon Ra, Zeus, Jupiter, Apollo and Wodin are all, probably, personifications of the king of the heavens; and, as a merely physical object, the sun has been worshipped by native tribes in southern United States, Mexico and Peru, and still is, to-day, by the Parsees, the modern representatives of the Zoroastrians. This need cause no wonder. The sun is the most striking and splendid single object in nature. It is the source of light and heat; it is the dispenser of health and happiness; it is the giver of life itself. All will admit that the sun is essential to the welfare and continued existence of all living creatures, whether animals or plants. Yet, while this fact has been patent for long, it is only recently that the explanation of the fact has been dawning. The story of the sun, in this its latest phase, is as entrancing as the plot of any novel; and we are only on the threshold of our knowledge.

As an evidence of the wide interest that the subject is beginning to evoke among all classes, reference may be made to the "Sunlight and Health Number" of the London *Times*, which appeared on May the twenty-second, last. This is a publication of forty large pages, twenty-two of them being devoted to articles by recognized authorities

on different aspects of the subject. The words of the *Times* in the introductory editorial are so happy and appropriate that they must needs be quoted here.

"The modern use of sunlight as a healing agent is a rediscovery of knowledge which at one period of history was widely disseminated. Nevertheless, the modern use of sunlight is entitled to rank as in some way a new departure, for it is based on observation and study which belong peculiarly to the present stage of the evolution of science. The story is among the most interesting and romantic in the annals of medicine. Some ten years ago, when Europe was engaged in the final struggles of the Great War, the discovery was made that the lack of animal fats, which had resulted from the enormous consumption of fat in the manufacture of high explosives, had reduced human resistance to a number of diseases. Rickets was widespread throughout the Central Empires; tuberculosis was taking a greatly increased toll of life in all the belligerent countries. When the war ended efforts were made to supply fats, in the form of cod-liver oil, to the children of Vienna and other stricken cities, and then the strange observation was made that this supply, though apparently essential in the winter months, became less necessary as summer

advanced. The first glimmerings of the truth were received that animal fats are, in some respects at any rate, an equivalent of sunlight in the balance of health, or, in other words, light is food. Only eight years have passed since the first announcements of the discovery were made, yet in these eight years a new science has been established and a new therapy introduced."

Attention was directed anew to the work of Dr. Edward Mellanby, who, in 1915, had made the discovery that rickets is a "deficiency disease," thus bringing it into the same category with scurvy and beri-beri. The trouble lies, as all now know, in the lack of a substance known as "Vitamin D," which Dr. Mellanby showed to be soluble in fats and oils.

When the war ended a commission was sent to Vienna by the British Medical Research council, in collaboration with the Lister Institute of Preventive Medicine, consisting, with others, of Drs. Harriette Chick, Elsie Dalyell, Helen Mackay and Miss E. M. Hume, which investigated the subject of rickets for about three years. Then it was that the beneficial effects of sunlight in this disease were laid bare, and the conclusion was reached that in some unknown manner the rays of the summer sun supplied the deficiency for which, in winter, cod-liver oil was a specific. The questions were then asked:—"Is cod-liver oil, then, a sort of bottled sunlight?" The cod is a deep-sea fish, living in northern waters, remote from the rays of the sun. "How can sunlight reach it?" In due time came the answers. On the surface of the sea are countless myriads of animalculae, known as plankton, which have the power of absorbing the sun's rays, much as blotting-paper absorbs ink. These minute creatures form the food of the squid, which in eating them acquires their treasure store of light. In turn, the squid is eaten by the cod, and so, by two steps, the actual rays of the sun become stored, to become potential for good, in the liver of the cod.

While these researches were going on, Dr. Huldchinsky, of Berlin, also working on rickets, made the remarkable discovery that if, instead of giving cod-liver oil to a child affected with rickets, he gave it a bath in the light from a quartz mercury-vapour lamp,

recovery took place. In other words, the light from the lamp was the equivalent, therapeutically, of cod-liver oil. This discovery was investigated by the Vienna commission and its truth confirmed.

Now the light from a quartz mercury-vapour lamp possesses properties like those of the summer sun. It seemed, therefore, that certain animal fats are related in some way, at least so far as their influence on the human body is concerned, to solar rays, whether natural or artificial. Here, again, was a puzzle. It was known that the chemical rays, that is the violet and ultra-violet rays, cannot penetrate the skin more than the fraction of a millimetre. Could it be possible that rays which cannot pass through the thinnest skin could influence the body in much the same degree as fatty foods? Some extraordinary experiments were next carried out. One of these was to keep a number of rats in the dark and without fat. They developed rickets. But, if the floor of the cage was spread with sawdust that had been exposed to sunlight rickets was prevented. The conclusion is obvious. Next, Professor Steenbock, of Wisconsin, discovered that many foods which did not contain animal fat could be charged with the fat-soluble vitamin by exposing them to the action of the summer sun or the quartz mercury-vapour lamp. The vitamin in question was found to be different from the growth-promoting vitamin A and also from vitamins B and C. So it was called vitamin D.

Among substances widely distributed in nature, a constituent of all animal cells and of the natural oil of the human skin, is a solid alcohol known as cholesterol. It soon developed that irradiated cholesterol, as commonly found, contained vitamin D., whereas cholesterol not so treated did not. The rationale of the whole wonderful process is therefore this. The cholesterol of the skin may be called the pro-vitamin. The chemical rays do not shine through the skin; they shine on it, and, so doing, charge the cholesterol therein with vitamin D, which thus constitutes a store upon which the body may call at any time by means of the blood circulation. However, pure cholesterol cannot store up vitamin D under the influence of light. It has been found that the important substance is an impurity commonly

found in cholesterol, now known as "ergosterol." As has been aptly said, ergosterol is the true "sunlight sponge."

More recently, confirming this new principle, the Misses Hume and Smith, associated with Dr. S. N. Lucas, have tried the effects of inunctions of irradiated cholesterol into the skin of rats and rabbits, and found that this procedure could prevent the development of rickets. Thus, the mysterious action of sunlight is convincingly explained. To the well-known physiological actions of the skin, as a protector, an organ of tactile sense, a heat regulator, and an eliminator, must be added another, fully as important, namely, that of absorbing and fixing the chemical rays of light, thus transforming them into a life-giving benefactor.

Ergosterol is a white crystalline substance, first isolated from ergot of rye, by the French chemist Tauret. When irradiated it becomes a pale yellowish oily substance of extraordinary potency. A daily dose of one-hundred-millionth of a gram will produce normal calcification in a rat fed on a rickets-producing diet. The manufacture of ergosterol is now an important industry, and it is possible to incorporate measured quantities of vitamin D with various foodstuffs, such as bread, biscuits, milk, butter, margarine, malt and chocolate. The summer sun of Canada or Australia can now be trapped and confined in a bottle of milk or a pat of butter, and shipped to less favoured lands. The whole thing reads like a fairy-tale.

But, what are vitamins? Are they chemical entities or merely properties, hitherto unknown manifestations of electronic force, as tenuous as the fairies themselves? Only time can tell.

It is a matter of common knowledge that diseases of the respiratory system, notably, influenza, pneumonia and bronchitis, are more frequent and more deadly during the winter months. The general death rate, both in adults and children, is higher during the same period. It is also known that from October until March the sun's light is very poor in the chemical rays. We may safely say that the months of darkness are the months of disease and death. In fact, we have to store up sufficient vitamins in summer to carry us over the winter.

Dust, smoke (more abundant in winter), fog, confinement within doors, and heavy clothing are all factors that render less efficient the beneficent properties of the sun. The remedies are obvious. In passing, it may be remarked that, whatever may be thought of the clothing of the modern woman from the standpoint of art or morals, it at least is healthy. Low-necked and sleeveless dresses, short skirts, and imitation-silk stockings certainly allow the ultra-violet rays fuller play than did the old-fashioned dress of heavy material, high-necked, long-sleeved, and often trailing on the ground. Could the modern man be induced to adopt a modified scout costume, with no hat, loose neck-cloth, and "shorts," he too would absorb more health. One wonders if the Doukhobors in our North-west were not ahead of the times!

The cult of the sun is quickly coming to the fore. The proof of this is seen in the remarkable results that are being obtained in the treatment of surgical tuberculosis by means of sun-baths, as in the Lord Mayor Treloar Hospitals at Alton in England, and at Leysin, Switzerland.

But what is to be done in winter, when the sunlight is so ineffective. Cod-liver oil, irradiated foodstuffs and ultra-violet-ray baths can meet the need to some extent. Unfortunately, irradiating foodstuffs, to increase their store of vitamin D, often makes them unpalatable, and, what is perhaps worse, frequently destroys the other equally essential vitamins. More study is needed here.

The matter of the practical application of the principles so far discovered demands a word of caution that cannot be too frequently repeated. In the case of sunlight, particularly when artificial, we are dealing with a potent agent. Its value is beyond question. We know very little about its harmful properties. Yet, that it has some is equally beyond question. Only continued research can put the question of sunlight therapy on a sane scientific basis. Nations have been looking for their "place in the sun." So will individuals, but they should do it with circumspection and only under competent advice.

In the meantime, we may expect to find, as has already so often been the case in religion and philosophy, that false prophets will arise, who will exploit the wonders of science and the credulity of the uninformed

for their own profit. Medical men must lend their influence to put a drag on the wheels of the coach of progress, when it takes this direction.

A. G. NICHOLLS

ADMISSION TO MEDICAL PRACTICE

FROM sea to sea, across Canada, the medical schools have completed the work of another session, and at the convocation exercises of their several universities, some hundreds of young men and women have received the coveted diploma, the God-speed of Alma Mater and the plaudits of friends. They have left the university halls well instructed in the subjects of the medical curriculum, with the inspiration of earnest and efficient teachers, full of high hopes and lofty aspirations, anxious to take up the responsibilities of the physician's calling and to enter upon the great enterprises of life.

But while they have satisfied university authorities that they are worthy of their diplomas and of the trust which the award of these diplomas implies, it is the belief of a very considerable proportion of the body politic that they have not been examined enough, and so they must now appear before other bodies of examiners with whom rests the decision as to whether or no they are to be permitted to practice their profession. Scarcely has the recent graduate recovered from the hectic days and nights of the final examination period, and scarcely have his ischial tuberosities ceased from burning under unwonted strain and friction, than he must begin preparation for another series of examinations which, though unlikely to be more searching, are very likely to be more trying, because conducted by men who are mostly complete strangers to the candidates and who may not be in very intimate touch with academic work.

The reason assigned for this duplication of examinations is that the public must be protected from doctors with inferior preparation. There was a time when inferior schools were numerous, though not in Canada. At the time of Confederation provision was made for provincial autonomy in educational matters, and in each province a body was constituted to administer a Medical Act. Each Medical Act was originally de-

signed for the protection of the public. Some have been so amended that they do not furnish adequate protection to the public; none are, or ever were, intended to be of special benefit to the medical profession.

Prior to, say, a quarter of a century ago, one of the chief duties of a provincial medical board was to prevent its province from being overrun with graduates of inferior schools which flourished in an adjoining country. The readiest method of elimination was the examination, and so each provincial board set up its own examination, which must be passed by everyone who wished the license to practise in that province.

Conditions have changed so entirely within the past few years that from all over Canada we hear voices raised in protest against present examination requirements. It is argued that Canada is no longer dependent in any degree upon other countries for her supply of physicians. Her own schools rank well amongst the medical schools of the world, and Canadian medical graduates rarely suffer by comparison with graduates of schools in other countries. The medical profession throughout Canada is fairly well organized, and is practically a unit in demanding high standards of medical education. Why, therefore, should not more responsibility be placed upon the universities and why should some measure not be devised which would place both tuition and the examinations under such control as would satisfy all concerned that graduation could be taken as evidence of professional capacity and trustworthiness? The retort which perhaps counts for most is that there will still be an occasional application for registration from a foreign school, and that difficulty might be experienced should a foreign candidate be required to take university rather than provincial examinations. The argument is offered for what it is worth. Possibly, it might be advisable to maintain intact the machinery for an occasional

provincial examination. But cannot consideration now be given to some means which will obviate the necessity for graduates of Canadian medical schools to take other than the university examinations?

We look to the Motherland for our lead in many things. In this particular, could not the procedure there, with such modifications as may be necessary, be made applicable to Canada? Thus the Medical Council of Canada might be empowered with general supervision of the curricula of the several schools and have valuers attend at examinations. To graduates of all satis-

factory schools, the certificate of the Medical Council of Canada might be granted at once. An unsatisfactory school would be quickly brought to the mark if its graduates were refused the certificate of the Council.

There are difficulties in the way, of course, and the agreement of each province would have to be secured. But these difficulties should be no greater than those encountered and overcome by Sir Thomas Roddick and those associated with him in getting the legislation known as the Canada Medical Act and in establishing the Medical Council of Canada.

W. H. HATTIE

CHRONIC APPENDICITIS

APPENDICITIS is a subject of ever-recurring interest, and, in view of its importance, will doubtless continue to be so. The acute variety, usually clear-cut in its manifestations and onset, presents as a rule little difficulty in its recognition and treatment. This is not the case with the chronic form. In looking over recent articles and discussions on chronic appendicitis in the medical journals, one is struck with the haziness that invests the subject and the differences of opinion that very competent observers have expressed about it. In fact, after perusing these, one is likely to fall into the same horrid state of incredulity that characterized Betsy Prig in regard to Mrs. 'Arris, when she exclaimed: "I don't believe there aint no sich person."

Assuming for the moment that there is such a condition as "chronic" appendicitis, the symptoms usually attributed to it are so inconstant and, moreover, may be produced by so many other conditions, that the clinician will frequently be in doubt. Under such circumstances the pathologist has, or should have, the last word. It may, then, very properly be asked what light he has to throw on the matter.

At the outset it should be made clear that there is a common condition of involution, or "senility," of the appendix in which that structure becomes gradually atrophied and fibrosed, with obliteration of the lumen commencing at the tip. This process begins in the early twenties, and affects about twenty-five per cent of appendices, according to Ribbert and A. O. J. Kelly (Philadelphia

Medical Journal, 1899, IV., 928, 983 and 1032). Ribbert, in a study of four hundred appendices removed *post mortem*, found this process going on in the absence of any indications of previous inflammatory change. Such appendices are smaller than normal, fibrous, but flaccid, and microscopical examination fails to reveal the presence of inflammatory cells or anything else except involution, with a replacement fibrosis and a deposit of fat. Some surgeons would include this condition with chronic appendicitis, but this classification is clearly wrong.

Excluding such, then, instances are met with, both in operating-room and autopsy material, in which the appendix is large, thickened, rigid, somewhat hyaline in appearance, with more or less complete obliteration of the lumen, sometimes cystic. It may also be adherent. Microscopical examination shows diffuse infiltration of all the coats with inflammatory round cells and leucocytes; fibrosis; loss in parts of the mucosal lining; destruction of the lymphoid follicles; and obliteration of the cavity. The process is entirely different from the other, and must be regarded as inflammatory.

The question arises whether this latter condition is the result of previous acute attacks, to be called, perhaps, "relapsing" appendicitis, or whether it is "chronic", that is, slow and insidious from the start. Inasmuch as appendices removed during an acute attack or in an interval sometimes show fibrotic changes, there can be no doubt that the first-mentioned possibility is a fact. In this case, between the acute attacks there

is a period of quiescence, but yet, the inflammatory process goes quietly on. It is stated, on good authority, that the appendix described above as that of chronic inflammation may be found in cases where a history of previous attacks of inflammation is lacking. If so, this must be rare. It is to be desired that some investigations should be made to clear up this point definitely.

While clinicians are disputing, there can be no doubt in the minds of the pathologists that there is such a condition as "chronic" appendicitis. It is, undoubtedly, not often seen, however. The main reason for this probably is that patients, as a rule, either are operated upon or die during the acute phase. The surgeons who admit the existence of chronic appendicitis seem to be agreed that the condition is rare.

The importance of this conclusion lies in the logical inference that, in the presence of symptoms suggestive of chronic appendicitis this condition must not be diagnosed until everything else has been excluded.

A discussion on chronic appendicitis in children took place on February 24th, at a combined session of the sections of the Study of Disease in Children and of Surgery of the Royal Society of Medicine, in which some useful points were brought out. Mr. A. J. Walton, in regard to incidence, reported 906 cases of appendicitis, 305 of which he regarded as chronic (33.66 per cent); 186 cases occurred in children under the age of fourteen years, of which 33 were chronic (17.74 per cent). That is to say, Mr. Walton finds chronic appendicitis to be rather less than half as frequent in children under fourteen as in older persons. The figures are: adults, 37.77 per cent; children, 17.74 per cent. None of his cases in children had been chronic from the beginning. His category of chronic cases included those without active symptoms, even though the condition was a late sequel of an acute attack, and also those with distension, fibrosis and stricture formation, and external dense adhesions. His list probably also included cases in which the appendix was not diseased, but showed senile atrophy or was involved in a Jackson's membrane. We have given reasons why senile atrophy should not be regarded as chronic appendicitis, and should like to know how many of Mr. Walton's cases came

under this category. Evidently, the figure 33.66 per cent for chronic cases in the total number is too high. Of course, this remark does not apply to the juvenile cases, in which normal involution would not have set in.

The conditions that should be considered in any given case before a diagnosis of chronic appendicitis is made are:—acidosis, atony of the caecum with vaginal ptosis, ureteral calculus, "dyspepsia" due to peptic ulcer or gall-stones, tuberculosis and actinomycosis in the neighbourhood of the appendix, carcinoma of the appendix, and, in children especially, acidosis, enlarged lymphnodes at the ileocaecal angle, mobile caecum, kinking of the ileum or appendix, inflammatory bands, intestinal colic, and, in girls, ovarian and other pelvic conditions. Acidosis has been mistaken for acute appendicitis, as pointed out by Drs. Gibson and Mann in their paper published elsewhere in this issue, and may also be a cause of symptoms attributed to relapsing and chronic cases. This mistake is not likely to happen if the possibility is remembered and care exercised.

Pain in the right iliac fossa, especially if localized to McBurney's point, or coming on after exertion rather than after meals, would be suggestive of appendicitis. X-ray examination in some cases may be of service, though in others it may only confuse. If the appendix can be visualized after the barium meal, retains its load more than forty-eight hours, and is definitely restricted in movement on palpation, the presumption is fair that the appendix is involved in some way, though it need not be by chronic inflammation. Or, if the appendix does not fill, it would suggest kinking or obstruction of the lumen.

The importance of a correct diagnosis lies in the fact that only by having a correct and full idea of the condition present can the proper relief measures be instituted. It would be quite possible, for instance, to operate and remove an adherent appendix, where it was only secondarily involved, without relieving the symptoms, and even to make them worse by adding new adhesions to old. Clearly, much circumspection is needed in dealing with chronic appendicitis and the many conditions that may simulate it.

A. G. NICHOLLS

THE SIGNIFICANCE OF RÂLES

HOW much should we depend on râles as a guide in detecting the early stages of pulmonary disease? And once they are established how much are they an index as to the progress of the condition? These questions are raised by Dr. F. H. Heise (*Am. Res. of Tuberc.*, April, 1928, xvii), in a study of a series of tuberculous patients at the Trudeau Sanatorium, and his answer tends to the general conclusion that râles are by no means reliable guides in early diagnosis, nor yet in prognosis. He has examined case records of 1877 tuberculous patients, and has compared the findings recorded on their admission with the confirmed diagnosis made later on, making a special point of the degree of inflammation given by the x-ray. Dividing his cases into groups of minimal, moderately advanced, and far advanced, his investigations bring out the following points:

In 351 of the minimal cases only 145, or 41 per cent, were found to have definite or even questionable râles on the first examination, leaving more than half (59 per cent) with no râles discovered at this stage. In nearly all of these minimal cases, however, definite x-ray changes were found.

The moderately advanced cases formed a group of 1,299, and of these it was found that 980, or 75 per cent, showed râles, leaving a rather large percentage (considering the degree of the disease) in which diagnosis would not have been made if râles alone had been the guide.

In the far advanced cases, as might be expected, râles were noted in nearly 90 per cent of 227 patients.

It is difficult to lay down hard and fast principles regarding the significance of râles. There is probably no other physical sign to which the medical man is introduced so early, and none other which we must more clearly learn to recognize, and also to discount, at its proper value. It is not to be expected that it will be disregarded as a guide in diagnosis, but with such discrepancies between their existence (or detection) and the proved presence of early disease, there should be less temptation to wait for their appearance before deciding that disease is developing. After all, their detection is affected by

anatomical considerations, and, besides, the earliest stages of tuberculosis may not necessarily be accompanied by râles. There is still room for proof as to how the finer type of râles are produced.

What we should learn from this investigation, therefore, is not to underestimate the significance of râles *per se*, but rather to refuse to be misled into a feeling of security because we cannot detect them.

The next point taken up by Dr. Heise deals with the information that râles give in regard to the cause of the disease. Are we to assume that the improvement in a focus is accompanied by a corresponding diminution in the number of râles and the size of the area over which they are heard, or *vice versa*. There is no doubt that in acute relapses or well marked improvements changes in the quality and number of râles can be easily appreciated, but do these changes coincide enough to give the fullest information as to the progress of the disease?

To answer this question, 412 records were gone over to see how changes in the râles compared with what the x-ray showed, and it was found that during a period of six months the râles remained the same as to area and character in 111 cases. But the x-ray examination of these cases showed definite improvement in 93 per cent, relapse in 2 per cent, and a stationary condition in only 5 per cent. From this it may be assumed that, if râles are to be taken as an index of progress, their being stationary is strongly in favour of improvement in the lesion.

Even when the râles were found to have increased in area, however, x-ray showed that in a large percentage there was improvement, and that only a small number had remained stationary. In only 23 per cent did the increase in râles coincide with an advance as shown by the x-ray. It was when the râles were in process of diminishing that there was most nearly complete correspondence: in 88 per cent of this type of patient the improvement was confirmed by the x-ray. In a small percentage, however, there was relapse or a stationary condition. Under these conditions, it seems fairly safe to conclude that lessening of the number and

area of râles indicates improvement. Complete disappearance of the râles again is a reasonably safe indication of improvement, although it was found that there was a small percentage which showed relapse or a stationary condition even under these conditions.

These are conclusions which are reached by considering the diagnostic value of the râle by itself. They should, however, serve to emphasize the importance of considering the case as a whole, rather than from the point of view of one physical sign only.

H. E. MACDERMOT

Editorial Comments

PUBLIC HEALTH NURSING AND THE UNIVERSITY OF MONTREAL

The Annual Report of the School of Public Health Nursing, University of Montreal, and the French Health Centre, a summary of which is printed in this issue of the *Journal*, furnishes some interesting and instructive material. The School is for the training of public health nurses, to serve the French-speaking section of Canada; the Health Centre, conducted as a health demonstration, provides for the field training of the students. This arrangement has worked most satisfactorily for all concerned—to the University, primarily interested in the training, and to the General Health League, chiefly interested in the demonstration.

From the report, it is evident that a very intensive service is given in the two parishes covered. The very high percentage (62) of expectant mothers under supervision in their homes, of whom 43 per cent were under observation from the fourth month, is evidence of the thoroughness of the work. As would be expected, the infant mortality rate, which always quickly reflects the health work being done, shows a remarkable decline from 154 in 1926, to 87 in 1927. While it is unsound to draw final conclusions based on one year's figures, it might be noted that the infant mortality rate for the City of Montreal in 1926 was 119, and in 1927, was 113.

In this centre, the B.C.G. vaccine has been given to 391 infants. The need for a more complete follow-up of these cases, as mentioned in the report, is obvious, if anything of value is to come from this interesting piece of work. The fact that it has been fairly easy to persuade mothers to have their children vaccinated against tuberculosis by this method is encouraging. This is, no doubt, in large measure, due to the nurses being known in the home, and it speaks well for the confidence of the family in her. It also suggests the comparative willingness to take things which are administered by mouth, as compared with consenting to injections. This is borne out by the figures for diphtheria immunization which show 28 per cent of the pre-school age children from one parish, and 5 per cent of the other,

as having been immunized against diphtheria, as compared with 49 per cent and 30 per cent of infants vaccinated against tuberculosis for the same parishes.

The Psychiatric Clinic, one of the health clinics at the Centre, is the first of its kind to be established in Montreal to serve the French-speaking section of the community. This is a matter of importance, particularly in connection with the development of special classes in the schools.

Through arrangement with the Department of Health, the health services in two schools, and the supervision of communicable diseases in the area are made available for teaching purposes. This, together with a bed-side nursing service, makes a most complete round of health clinics and health services in the home.

It is evident that any public health nurse who has had the training offered by the School has built up a sound foundation of theory and experience for her future work. It is also evident that the demonstration should serve to convince the authorities that results can be obtained in Montreal, as elsewhere, by the proper expenditure of reasonable sums of money.

The University of Montreal is to be congratulated on a good piece of work well done and deserves well of the community therefor.

A. GRANT FLEMING

RABIES IN ONTARIO

The recent outbreak of rabies in Kingston, Ontario, and its vicinity, opens up once more the question of the prevalence of this dread disease in Canada, and, therefore, its importance as a health problem.

In Canada generally there have been no deaths among human beings, fortunately, and comparatively few in the United States. It is probably for this reason that it is difficult to get reliable information on the subject. Dr. Thurman B. Rice and Norman Beatty, of Indianapolis, Ind., (*Am. J. Pub. Health*, 1928, xviii, 421) have discussed the question of the prevalence and distribution of rabies in various countries, obtaining their information by means of questionnaires and a careful search of the literature, and

they conclude that this disease has been on the increase in the United States, or, at least, that this was the case two years ago. In general, rabies is more prevalent in those parts of the world where poverty prevails and civilization is retarded. Reference to a map prepared by these authors show that there is little or no rabies in the States abutting on the international boundary, with the exception of New York. Consequently, one would expect to find that only rare and short-lived outbreaks of the disease have occurred in Canada, and this is the case. In 1926 there was an outbreak of this disease in the Province of Quebec, spreading rapidly from two foci; in 1926, also, in Ontario forty-one positive brains were discovered; a few cases have been noted in Manitoba; and only one case in British Columbia. A total of 31 positive heads of dogs and cattle, from Kingston and its vicinity, have been examined in the laboratories of Kingston, Toronto, and Ottawa since October 27, 1927. This is only a small percentage of the animals which actually died of the disease.

In dealing with the situation, efficient vaccination of dogs on a large scale has been found to be impracticable. The preventive measures resolve themselves into muzzling all "respectable" dogs, tying them up, and destroying the vagrants, the latter being particularly liable to disseminate the disease among their kind. The remedy, therefore, is simple and has proved sufficient to stamp out the disease. It is gratifying to know that the situation in Kingston is well in hand.

The *Journal* is indebted to Dr. W. D. Hay, Assistant Professor of Pathology in Queen's University, for a short statement of the situation in Ontario as it has developed up to date, which appears in this issue.

A. G. NICHOLLS

THE HARVEY TERCENTENARY

In this year of notable anniversaries, in a constellation of stars of great magnitude, one name shines out with particular brilliancy—that of William Harvey.

It is three hundred years since his epoch-making book appeared, a little book in point of size, but a great book in view of its contents and what it portended. For, the *De Motu Cordis* set forth for the first time in centuries a physiological fact, and that a fundamental one, which was proved conclusively by observation and experiment. Thus was laid securely the foundation of modern medicine and therapeutics. Not that the victory for science—demonstrated truth—was won at that time. Indeed, the struggle between mediaevalism and modernism was only beginning. Harvey's work was received with complacency by the many, with virulent vituperation by the few, and his

views did not gain general acceptance for some seventy years. As a matter of fact, the struggle goes on still, but Harvey made the first breach, and the eventual outcome can now hardly be in doubt.

William Harvey came at the psychological moment. The spirit of the Renaissance was strong in Italy and England, and he imbibed it to the full. He took his B.A. at Cambridge and then went to Padua, that Mecca of the medical student, where in 1602, he became Doctor of Physic and Philosophy. Thus, Harvey became conversant with the best thought of both countries. At Padua he studied anatomy under the renowned Fabricius ab Aquapendente, and, it is thought, may have received his inspiration in regard to the circulation of the blood from his master's *De Venarum Osteolis*, the dissections for which, as a senior student, he very likely helped to make.

Returning to England, he took another medical qualification at Cambridge; later, becoming physician to St. Bartholomew's Hospital, and Warden of Merton College, Oxford. His was a well-rounded character, and one could well predict eminence for such as he. For twelve years Harvey preached his doctrine of the circulation to his classes before he ventured to immortalize it in print. This he did eventually, as he tells us, only that he might stop the calumny and misrepresentation that was beginning to assail him. His triumph, if not indeed speedy, is yet at length complete.

"Experimental science has three great prerogatives over other sciences; it verifies conclusions; it discovers truth which they never otherwise would reach; it investigates the course of nature, and opens to us a knowledge of the past and of the future." Thus wrote Roger Bacon of Oxford, the "Doctor Mirabilis," some four centuries before. The time was not ripe for such teaching as this; it was hardly ripe in Harvey's day. That the conception has prevailed is largely because of Harvey, Bacon's spiritual son.

A. G. NICHOLLS

HENRI DUNANT AND THE RED CROSS

One other illustrious name, at least, should not be overlooked in this year of grace, 1928.

One hundred years ago, on the 8th of May, was born in Geneva Henri Dunant, a man who, judged by history, must be regarded as one of the world's greatest philanthropists. For it was he who, if not indeed the actual founder of the Red Cross movement, was its champion and vivifying force. The story affords one more illustration of how good may come out of evil. Conceived amidst the horrors of war, the idea symbolized by the Red Cross was taken up and nurtured by Dunant, and in our day it has

become a great beneficent movement which has extended into every civilized country.

Henri Dunant was the son of Jean-Jacques Dunant, a member of the Council of Geneva, and of Anne-Antoinette Colladon, the sister of a famous Swiss surgeon. He was brought up in an atmosphere of refinement, religion, and philanthropy, and early took an interest in certain movements for the betterment of the lot of mankind which were being talked about at that time. Besides his mother, three women in particular seem to have influenced his mind, Harriet Beecher Stowe, whom he met in Geneva in 1853, Elizabeth Fry, and Florence Nightingale. The questions of slavery, prison reform, and military nursing, then, interested him greatly.

His opportunity came in 1859 when, travelling as a tourist, he arrived at the field of Solferino as the great battle was going on between the French and Italians on the one side and the Austrians on the other. Three hundred thousand men were engaged in the struggle for fifteen hours. The Austrians were routed, and from thirty to forty thousand men left, dead, dying, and injured, on the field, without anyone to come to their aid. Shocked at the sight, Dunant organized a band of volunteer workers, who for several days worked incessantly to relieve the situation. The neighbouring town of Castiglione became one vast hospital. The authorities issued an edict of neutrality to protect the workers, and they were officially recognized by the peasant costume of Lombardy which they wore.

This experience determined his future activities. For the next two or three years he travelled over Europe, lecturing and writing about the crying need for the organization of a proper medical and nursing service for times of war. Then, in 1862, he published his book *Un Souvenir de Solferino*, which attracted much attention. In it he drew a graphic picture of the terrible aftermath of the battle, the unbelievable suffering, and the heroic efforts made to meet the situation. He asked this question; "Why have we thought it well to recall these scenes of grief and desolation, to recount such lamentable and gruesome details, to draw such vivid pictures of despair?" The answer he gave is in the form of another question: "Would it not be possible to found and organize in all civilized countries permanent societies of volunteers which in time of war would render succour to the wounded without distinction of nationality?"

Another lecture tour followed, and Dunant's ideas gained acceptance more and more. The Society of Public Safety of Geneva, under its president, M. Gustave Moynier, took up the matter and organized the first Geneva Conference in 1863. Dunant's views were accepted, the scheme was systematized, and nation after nation adopted the provisions of the Treaty of

Geneva, until to-day fifty-nine nations of the world have subscribed to its articles. The inspiration of a simple citizen has become an international law among civilized peoples.

But Dunant's subsequent fate was only just saved from being a tragedy. He had spent his substance for the good of mankind; in the enthusiasm which attended the great movement he had initiated his part was overlooked, and he became an inmate of an almshouse. Fortunately, his plight was discovered by a French journalist, and the world was quick to rectify its neglect. Dunant was awarded, jointly with Frederic Passy, the Nobel Peace Prize in 1901. This honour was well bestowed, for by this time, in Dunant's mind the great idea of the Red Cross movement had expanded into another, greater still, one that will in time make the Red Cross less necessary—the idea that war must be outlawed among civilized races. In this way he continued to labour, and in 1910 died full of years and honour.

A. G. NICHOLLS

HIDEYO NOGUCHI

Dr. Hideyo Noguchi, of the Rockefeller Institute, died May 21st on the Gold Coast from yellow fever, while completing his studies on this disease. Thus, one more name is added to the list of medical men who have died as martyrs of science, in the search for truth. We are reminded of Lazear, Yersin, Dutton, Ricketts, McClintick, Pirrie, and Adrian Stokes, to name only some.

Noguchi was born in Japan in 1876. Coming to America, he became Assistant in Pathology in 1901 at the University of Pennsylvania; in 1903, Research Assistant in the Carnegie Institution; in 1914, a member of the Rockefeller Institute for Medical Research.

His contributions to medical science were numerous and of the first order. Among them were, the artificial cultivation of *spironema pallidum*; the demonstration of the organism of syphilis in the brain in general paralysis, and in the spinal cord in locomotor ataxia; the introduction of the luetin test for syphilis; the cultivation of micro-organisms associated with infantile paralysis and rabies; a method for attaining a bacteria-free vaccine for small-pox; and the isolation and cultivation of *Leptospira icteroides*, and the development of a preventive vaccine and serum in connection with yellow fever.

He was the recipient of honours too numerous to mention here. His death removes one of the outstanding figures in our profession, and leaves the world of science much poorer.

A. G. NICHOLLS

Special Articles

PEACE-TIME POLICY AND HEALTH PROGRAM OF THE RED CROSS IN CANADA*

A REVELATION OF THE WAR

BY JAMES W. ROBERTSON, C.M.G., LL.D.,

Chairman of Council, Canadian Red Cross Society, Ottawa.

For the first time in all history the Great War furnished the occasion and made evident the necessity for a medical examination of practically the entire manhood, between certain ages, of Great Britain and some other countries. That is a very noteworthy fact. The results shown by these examinations were not published during the War.

The Report, known as Volume 1, upon the physical examination of men of military age by National Service Medical Boards in Great Britain from November 1, 1917 to October 31, 1918, covers practically the last year of the war. The number of examinations held during that period was 2,425,184; and a summary of the results shows the following facts:

Of every nine men of military age in Great Britain, on the average three were perfectly fit and healthy.

Two were upon a definitely infirm plane of health and strength.

Three were incapable of undergoing more than a moderate degree of physical exertion, and could almost (in view of their age) be described with justice as physical wrecks.

The remaining one was a chronic invalid with a precarious hold on life.

After reviewing the whole situation in the light of previous volunteer enlistments, etc., the report goes on to say:

"It seems probable, therefore, that the men examined in the year under review may be regarded in the aggregate as fairly representing the manhood of military age of the country in the early part of the twentieth century from the standpoint of health and physique; and that deductions founded upon the observations made at the medical examination of these men may be legitimately looked upon as a trustworthy criterion of the national health of the period."

ACTION TO MEET THE SITUATION

What about the women and children in a nation whose men at military age were in that state? Disaster from without had been vanquished, but danger threatened from within.

*This being the centenary of the birth of Henri Dunant, the founder of the Red Cross Society, general attention has been again directed very strongly to this organization. At the request of the *Journal* Dr. Robertson, Chairman of the Council of the Canadian Red Cross Society, has been good enough to prepare this statement on the activities of the Red Cross in Canada. We desire to thank him cordially for this contribution which is both instructive and timely.

Steps were therefore taken immediately (December, 1918) at the close of the war by the "Big Five," as they were called—Britain, France, Italy, Japan, the United States—to consider and deal with this situation that faced them all. A conference of the medical experts from these five nations took place at Cannes in the south of France, in April, 1919. A minute adopted by the Conference referred to the world-wide prevalence of disease and suffering as "due to widespread ignorance and lack of application of well-established facts and methods capable either of largely restricting disease or of preventing it altogether." The danger and the damage were due to ignorance and lack of application on the part of the people, not to want of knowledge and skill on the part of leaders.

Subsequently, because of the conclusions of these medical experts, the Peace Conference itself put into the *Covenant of the League of Nations*, Article XXV., in which the members of the League pledged themselves "to encourage and promote the establishment and co-operation of duly authorized voluntary national Red Cross organizations having as purposes the improvement of health the prevention of disease and the mitigation of suffering throughout the world."

The Parliament of Canada proceeded to alter the constitution of the Red Cross Society, to give it the necessary authority "in time of peace or war to carry on and assist in work for the improvement of health, the prevention of disease and the mitigation of suffering throughout the world."

That is the mandate to the Society to go ahead with its peace-time program. The great need of the present time is the improvement of personal and home hygiene. Manifestly, that can be secured only by the willing and intelligent participation of individual men and women and boys and girls. The thing to be done is to bridge the gap between the knowledge of the essentials of personal hygiene and home hygiene now possessed by the natural leaders in preventive and protective medicine—namely, the doctors, public health officials and nurses—and the knowledge and practice generally of the women who are in charge of homes and schools.

RESULTS FROM THE EXAMINATION OF CHILDREN

Take one outstanding and typical example of the situation in Canada calling for action. At the end of the war, the Patriotic Fund, in Montreal, caused an examination to be made of a thousand children—children who were well, not sick, and whose mothers were getting some help from the Patriotic Fund because their fathers had been overseas. A great many more than a thousand were examined, and, as a result of the examination of the first thousand children, a great many de-

fects were revealed. The list shows an astonishing number of defects among these supposedly healthy children of the soldiers. Altogether, 6,404 defects were found. 694 children had "bad" teeth and gums; 918 of these 1,000 children were tea or coffee drinkers. The number of undernourished children recorded in that group of 1,000 was 299, about thirty per cent.

WORLD-WIDE MOVEMENT FOR HEALTH AND WELL-BEING

A Red Cross peace-time policy and program of work is now being carried on in fifty-four countries. It is, perhaps, the greatest world-wide movement on behalf of the well-being of women and children and the welfare of people in general since the introduction of Christianity. There has been nothing in the same class with it, nothing comparable to it in scope and fundamental values and nothing with similar promise of the early realization of its highest aims, as indicated by its marvellous achievements during the seven brief years it has been in operation.

The Junior Red Cross has already (by the end of 1927) been organized in 5,744 classrooms in Canada, with a membership of 157,155 children, banded together to carry out in practice the rules of healthy living and thereby form good health habits. The Junior Red Cross Movement is going on in thirty-four different countries with a membership of over ten millions of children.

HEALTH AND GOOD CITIZENSHIP FOR JUNIORS

The main object of the Junior Red Cross in connection with the schools is to help to bring about correction of the conditions indicated, as far as possible and, chiefly, by the children's own desire to participate. Every Department of Education has sanctioned the activities of the Junior Red Cross in the schools, and some Ministers of Education have gone so far as to press upon the teachers the desirability of giving it the quickest and widest application. The primary purpose of the Junior Red Cross is to get the boys and girls interested in learning and doing voluntarily those things which promote health knowledge and health habits, linking up a knowledge of hygiene with habits of living so that the child may have them for all time. The foundation of national fitness and national efficiency lies primarily in the establishment of health habits, and this can only be thoroughly done through the willing concurrence of the person concerned.

Unquestionably, the physical vigor of this nation could be greatly improved in two generations if, by iteration and reiteration, precept, example, and experience, we could so train our children that they would voluntarily and by force of habit keep their mouths clean, drink milk, eat wholesome cereals, consume fresh vegetables and fresh fruit, drink plenty of water, play in the open air, sleep 10 to 12 hours, and follow all the other laws of health that are at the back of the activities of the Junior Red Cross.

THE CRIPPLED CHILDREN'S FUND

In promoting the idea of helpfulness to others, the Junior Red Cross in Canada is chiefly concerned with the Crippled Children's Fund. In this connection a very wide interpretation is given to the word "crippled." Out of money provided by the children themselves, through a membership fee of twenty-five cents a year, or their other contributions to the Crippled Children's Fund, it pays railway fare to hospital and hospital expenses of crippled children whose parents are unable to do it for them. The Junior Red Cross Fund has taken care of more than 5,000 handicapped children up to the end of 1927. That is abundantly worth while. That is service, not in the vague and the abstract, but in a very real sense. It is altruism in action, goodwill in action, not in passive contemplation. In practical reality the children are acquiring good health habits, the essentials of good citizenship, of altruism and of international friendliness.

The net expenditure for the Junior Red Cross, last year, amounted to \$77,807.00.

OUTPOST HOSPITALS AND NURSING STATIONS

In its forty Outpost Hospitals and Nursing Stations, the Red Cross furnishes skilled professional service to the pioneers on the frontiers of settlement in six provinces. Last year more than 12,000 persons were treated in and through them. 866 were confinement cases, most of whom otherwise would have been without competent care. If funds permitted, many more Outposts might be established, to the incalculable advantage of pioneer settlers. The Outposts are always established and maintained in co-operation with the people of the locality and the Provincial Departments of Health. The net expenditure for this service last year amounted to \$139,866.00.

The type of Outpost selected for any community depends, of course, on the peculiar needs of the community and the resources available. There are, however, three types:

- (1) The centre for field nursing. The nurse works in the homes and schools of the district, but no provision is made for in-patients.
- (2) The rural outpost, with accommodation for one or two bed-patients, but with field-nursing as the chief work of the nurse.
- (3) The outpost in a village or small town which functions as a small hospital.

SEAPORT NURSERIES

Canada spends large sums in bringing immigrants to its eastern seaports, and the Red Cross realized that it might contribute something to the work. Consequently, in co-operation with the Department of Immigration and the Health Department, "Seaport Nurseries" were established in Halifax, Saint John and Quebec. In these are welcomed, under an emblem that wins their immediate recognition, the mothers and children who have come to find new homes in a

new land. The youngsters are fed and cared for; the mothers are given a comforting and kindly atmosphere in which to refresh themselves after their ocean voyage. Advice is often asked and as often cheerfully provided, and, when the time comes, the new citizens undertake the next stage of their journey happy in the knowledge that their welfare is a matter of concern to the Society that knows no national boundaries. They have learned, too, that on their arrival at their destinations other Red Cross workers stand ready to furnish any further service that may be found to be necessary. During the last year 35,312 infants, children and women were cared for and follow-up cards were sent for 5,219 families. The cost of these nurseries, last year, amounted to slightly over \$12,000.00.

HOME NURSING CLASSES

A course of instruction in Home Nursing and Home Hygiene was established by the Red Cross in 1924. 1,004 classes have been organized up to the end of 1927 and the course taken by over 13,000 women. These women have gained a knowledge of food-values and the importance of a well-balanced dietary to good health. They have been given simple instruction in the recognition of illness, and have learned the elementary principles of the care of the sick. They have thus become better managers of their own households, and they have been able to instruct and advise their less well-informed neighbours.

RELIEF SERVICE IN DISASTERS

Always in readiness, the Red Cross furnishes Disaster Relief to any community overwhelmed by catastrophe. Its services have been needed in the Haileybury conflagration, the Cochrane epidemic, a cyclone on the Prairies, and, only last year, when two villages in Quebec were destroyed by fire. If the whole world is stirred by an immense calamity, the Red Cross forms a world-wide agency for the collection and distribution of money and supplies.

SERVING DISABLED EX-SERVICE MEN

Red Cross service is still needed for some of those disabled in the war. Its function has been to supplement official services and to meet the needs of those cases which do not fall within government regulations. Red Cross visitors prove to the several thousands of those still in hospitals that they have not been forgotten. Last year this service required an expenditure of \$145,576.00.

POPULAR PUBLICATIONS

The Red Cross publishes and distributes authentic and appropriate health literature in a form that is easily understood by everybody. It employs most expert assistance and acts as interpreter between the scientist and the public, to the

end that the every-day citizen may have the best information and instruction obtainable. It publishes two magazines with a joint circulation of about 60,000 copies a month.

HEALTH OPINIONS AND HEALTH CONSCIENCES

In striving to carry out the purposes assigned to it under the Peace Treaty, the Red Cross has sought to translate them into practical health services such as I have indicated. It seeks to co-operate with other organizations, official and voluntary, and to strengthen all good health measures. It lays particular emphasis upon the necessity of seeking and accepting the advice and guidance of the natural and competent leaders in all health matters, namely, the doctors, public health officials, public health nurses and other competent teachers. Only by following such well trained leaders—men and women of high intelligence, professional ability, irreproachable integrity and devotion to the public good—can safe and continuing progress be made. The rôle of the Red Cross is to back up their services, to create public opinion in support of their work, and to diffuse such popular information among laymen and laywomen as will make opportunities for the special professional knowledge of the few to become beneficially effective in the lives of all.

REPORT OF THE SCHOOL OF PUBLIC HEALTH NURSING OF THE UNIVER- SITY OF MONTREAL AND THE FRENCH HEALTH CENTRE FOR 1927

BY J. A. BAUDOUIN, M.D., *Director*

Montreal

We have in 1927 completed the second year of our activities. The area covered in the work of our Health Centre, *viz.*, the parishes of St. Catherine and the Sacred Heart, comprises a population of about 19,000 souls. A total of 23,292 visits were made to the homes in this district, or an average of 1,941 per month. This represents an increase of 1,241 visits over the year 1926. These visits were made to 4,658 cases, an increase of 1,719 above those of 1926. The total attendances at the various clinics for the year amounted to 10,357, an increase of 3,047 over the previous year.

To accomplish the work there were available a personnel composed of one Directress of Nurses, two assistants, four staff nurses (the contribution of the Montreal Anti-tuberculosis and General Health League), and an average of 10 pupil nurses (for a portion of their time).

The various activities of our organizations may be classified under the following general headings: Child Hygiene; School Hygiene;

Industrial Hygiene; Home Care of the Sick; and Contagious Disease Service.

CHILD HYGIENE

The Department of Child Hygiene comprises the following services: Pre-natal Care, Post-Partum Care, Care of the Newborn, Care of the Well Baby, and Children of Pre-School Age.

The Pre-Natal Service has as its objective the decrease in maternal mortality, as well as the decrease in deaths of infants attributable to congenital debility.

The total number of mothers under supervision was 407. The total number of births in the area was 656. Therefore, 62 per cent of the births were, as it were, supervised pre-natally. If we recall that an enrolment of 25 per cent is regarded as satisfactory, ours approaches the ideal. Forty-three per cent of the total enrolment occurred during the first four months, a very satisfying fact. Besides the visits made in these cases, the School maintains a Pre-Natal Consultation Clinic, which was attended by 134 expectant mothers. Furthermore, about 53 per cent of the expectant mothers have, on the advice of the nurses, consulted a family physician.

All this work has shown its results, in that only two deaths occurred from puerperal causes.

Post-Partum Service.—About 65 per cent of the new mothers were visited by nurses, who render service in conformity with the directions given by the family physician.

Care of the Newborn.—The nurses' visits are made daily for the first week, then once a week, and cover the whole of the first month. This service is most valuable in its contribution to the campaign against the too numerous deaths that occur shortly after birth.

Care of the Well Baby.—Infants aged from one month to two years come under this service. One visit is made to each child per month. Moreover, the mothers are urged to bring their babies to the consultation clinics specially provided for them. All these activities have given us results that we consider very encouraging. In the case of St. Catherine's parish, the following table will establish this:—

INFANT MORTALITY

Year	Births	Deaths from 0 to 1 year	Rate of Infant Mortality
1915	334	94	281
1916	310	94	303
1917	298	82	275
1918	327	86	263
1919	308	76	247
1920	324	72	222
1921	300	47	156
1922	264	39	148
1923	274	56	204
1924	273	60	220
1925	265	34	128
1926	240	37	154
1927	265	23	87

The year 1927 has been the best that St. Catherine's parish has ever had. It shows at the same time an increase in the number of births and a decrease in the deaths, which is the most convincing demonstration that it is possible to furnish.

Gastro-enteritis and congenital debility are still the chief causes of infantile deaths. To combat the former we insist on breast-feeding. The importance of this is shown by the fact that this year all the deaths from intestinal trouble occurred in babies who were bottle-fed. Congenital debility depends mostly on prematurity. Here, the medical supervision of the expectant mother is of the greatest importance.

Service for Children of Pre-School Age.—This deals with children between the ages of two and seven years. Many of these are subject to malnutrition, physical defects, and contagious diseases. Two hundred and forty of these children attended the appropriate clinics.

CONTAGIOUS DISEASE SERVICE

Since the visit to the University of Professor A. Pettit, the School has been the distributing centre for the vaccine known as B.C.G. Three hundred and twenty-one vaccinations were performed, and of these 39 were revaccinated at the end of the year. Four deaths occurred, but none were due to tuberculosis. Fifteen of our immunized babies have been in contact with cases of active tuberculosis. Of these, thirteen are in good health; one is dead from capillary bronchitis; the other is sick. In the last case, there is a cough, and the doctor states that one lung is diseased.

Our tuberculosis service comprises also the home-visitation of the sick in our district. Seventy-five cases of tuberculosis are under our constant supervision. This number constitutes about one-third of the estimated cases in the district. The great majority of our cases are recruited from school children, those who have finished school, and adults from twenty-five to forty-five years of age.

In the families of our patients 339 contacts were found who live under the constant threat of infection. One hundred and forty-five of these have been examined medically. Fifty-two are in good health; 72 are suffering from malnutrition; and 21 are actually under supervision. Twelve children, threatened with tuberculosis, have been admitted to the Camp David of the Bruchesi Institute, and have benefited greatly by their stay in the country.

In the case of diphtheria, as this is a disease that is specially dangerous to children of pre-school age it is upon them that our attention has been focussed. With anatoxin-Ramon it is possible to confer a permanent immunity against this disease. A first injection of anatoxin was given to 236 children; 203 of these

came back for their second injection, and 152 of the latter came back for their third. The parents are asked to bring back their children four months after the last injection, in order that we may determine their immunity by means of the Schick test. More than 108 have been immunized, though only that number of certificates has been issued by the doctor in charge. Our figures show that only 28 per cent of the children of pre-school age in the parish of St. Catherine can be regarded as immunized, and 5 per cent in that of the Sacred Heart.

In dealing with other contagious diseases we are, of course, not so well armed. We have recourse to notification, isolation, the removal of contacts from school, and disinfection. To obtain necessary experience, our pupil nurses accompany the municipal nurse on her official visits. The experience that our nurses get is quite extensive, and I take this opportunity of thanking Dr. Boucher and the members of his staff for the facilities provided.

SCHOOL HYGIENE

The activities carried on for the benefit of school children include medical inspection service and a psychiatric clinic.

By agreement with the city Health Department the School furnishes visiting nurses to two schools (Salaberry and Garneau), which have an attendance of 1,182 children. In the course of their visits the nurses give talks on various health topics. Visits are, also, made to the homes of the children, to determine causes of absence, and to follow up cases of physical defect that have been noted. During these visits the nurses educate the parents and endeavour to obtain their co-operation in having the necessary treatments carried out.

Forty-six children were submitted to a psychiatric examination. Of this number 29 were found to be normal, and 17 showed some degree of retardation in their mental development. In three of the cases the retardation was of three years or more. This raises the question of the provision of a special class for those defective mentally. In connection with this general subject, we are glad to state that we have concluded a most fortunate arrangement with the National Committee for Mental Hygiene. Thanks to the generous co-operation of this Committee, Dr. J. A. Lussier was enabled to make some very valuable observations in the schools of Toronto, which are noted in his annual report. Furthermore, Mlle. Blanche Bourbonnais, a graduate of our school, was asked by the same committee to spend two months in Toronto, which has enabled her to render us very valuable service.

HOME CARE OF THE SICK

The care of the sick in their homes consti-

tutes a necessary part in a course designed for nurses taking up public health work. The service which a nurse is thus called upon to render in a family is always appreciated, and constitutes one of the best means of introduction into such families, of gaining their co-operation, and of making progress in health matters.

INDUSTRIAL HYGIENE

To meet the needs of the time the program of the School of Public Health Nursing includes Industrial Hygiene. We have an understanding with the Imperial Tobacco Company, the Simons Tobacco Company, the American Can Company, the Davies Meat Canning Company, the Dominion and Columbus Rubber Companies, whereby our students are permitted to spend some days in these establishments. To the representatives of these companies we desire to express our gratitude.

In concluding this report on the activities of the School of Public Health Nursing and of the Demonstration Centre, I must, in all justice, give credit for our success to the devoted and competent staff that we are fortunate enough to possess. Nor would the work accomplished been possible without the invaluable aid that we have received from the Government through the Hon. Athanase David, Provincial Secretary; from the City of Montreal; from the Montreal Anti-tuberculosis and General Health League; and from the Metropolitan Life Insurance Company. To these generous benefactors, I desire, in the name of all my colleagues, to express our sincere and deep gratitude.

CONCLUSIONS

1. The lowering of the infant mortality rate is the first indication of the success obtained by a health organization. A campaign against those factors that are most important in causing death is that most likely to be followed by practical beneficial results, and is, also, the most economical.

2. The administration of the vaccine B.C.G. is easy, and ought to be made general throughout the province as soon as possible, in order to enhance the results of the campaign against tuberculosis.

3. Immunization against diphtheria constitutes our chief weapon in the campaign against this disease. Extended to all children of pre-school age, this proceeding is capable of extirpating this disease, thereby preserving to us the lives of the 400 children that are lost to the province every year.

4. The contribution of Mental Hygiene to the great cause of teaching is eminently valuable and should become still more so in the course of time.

(An abridgement of the report kindly furnished by Dr. Baudouin, who deserves congratulations on the good work accomplished.—Ed.)

GASTRO-ÆSOPHAGEAL CARCINOMA: ITS DIAGNOSIS*

BY LOUIS J. NOTKIN, M.D.

Montreal

Early diagnosis of malignant lesions of the cardia and fundus frequently offers great difficulties. The relatively benign nature of carcinoma in these situations makes it imperative that diagnosis be made early, if surgery is to be of value.

Carcinoma of the fundus and of the cardia is of relatively frequent occurrence. The incidence reported by different observers varies from 7 to 20 per cent of all cancers of the stomach. Other observers note that 40 to 50 per cent of all cases of cancer of the œsophagus have their origin at the cardia. The difficulty in diagnosis lies in the absence of a clear-cut group of symptoms characteristic of the disease, and is increased by the limitations of the various methods of diagnostic technique. The symptoms of cancer involving the fundus are very often referred to the œsophagus, while symptoms of cancer of the cardia are generally gastric in nature. In the former case incomplete examination not infrequently results in the diagnosis of cardio-spasm or spasm of the œsophagus. In the latter case, where the symptoms suggest a gastric origin, x-ray examination may reveal an irregularity of the duodenal cap, which in this case is only an expression of the increased irritability of the stomach. In this manner only the associated condition is disclosed and the disease overlooked. In the presence of œsophageal symptoms the possibility of gastric carcinoma must always be borne in mind.

The onset of gastric carcinoma is sudden in a large proportion of cases, and gradual in a smaller number, where the cancer develops from a pre-existing ulcer. In all cases, however, there is a symptomless latent period of several months' duration and the initial stage at which the patient becomes aware of the disturbance may be regarded as the second stage of the disease. Loss of appetite, pain, gas eructations, regurgitation of small quantities of food or sour liquid, rapid satiation, and dysphagia are the symptoms most frequently complained of. Of these, dysphagia only, with or without remissions, is suggestive of lesions of the œsophagus, cardia or fundus. Malnutrition, cachexia, fever and enlarged cervical glands are late manifestations and are frequently absent.

The test meal gives no conclusive evidence, while estimation of the acidity may often prove misleading rather than helpful. Secondary anemia, if it occurs at all, is a late sign. Occult blood in the stools is an almost constant and early finding. Occasionally, occult blood may be

temporarily absent, hence the importance of repeated examination. Tarry stools are much less frequent.

While certain of the above signs and symptoms are suggestive, no one, or any group, offers proof positive of the presence of the malignant disease in the areas under discussion. The x-ray must be depended upon for the conclusive evidence. Æsophagoscopy is of little or no value in the diagnosis of cancer of the cardia or fundus, even in the presence of extensive invasion.

X-RAY DIAGNOSIS

From the roentgenological point of view there are two pathological groups of fundal and cardiac cancer:—(1) infiltrating flat growths, associated with shrinking (scirrhus type); and (2) the fungating, cauliflower-type of growth. The medullary type of tumour, which in the rest of the stomach gives rise to a filling defect, is seen in the fundus as a tumour-shadow, jutting into the gas bubble which may divide the barium stream as it enters the stomach. This form of tumour growth causes comparatively little difficulty in diagnosis. It is the flat, squamous-celled type that is troublesome. For the diagnosis of cancer at the cardia we must depend upon irregularity of the cardia and of the terminal portion of the œsophagus as direct signs.

The main difficulties in the x-ray diagnosis of cancer of the fundus and cardia are those caused by the location of the growth. In the case of carcinoma situated at the fundus the lesion may be overlooked, unless it is the medullary form and encroaches upon the gas-bubble, because the barium suspension does not fill the fundus in the upright position, nor do peristaltic waves ordinarily traverse the upper pole of the stomach. In the ordinary, routine positions of examination, cancer of the cardia may be overlooked, because the liver-shadow hides the subdiaphragmatic portion of the œsophagus; and, in the horizontal position, because the last portion of the œsophagus and with it the cardia are covered by the filled fundus. Carcinoma of the fundus, as has been previously stated, is frequently associated with spasm of the cardia or lower œsophagus, and that of the cardia with spasm of the lower œsophagus. These associated spastic manifestations may mask the more serious condition lower down in the gastrointestinal tract. It is necessary, therefore, when ordinary methods fail, to resort to special methods of x-ray examination in suspected cases.

If the barium suspension enters the stomach without being arrested in its downward course, or without disclosing some irregularity of the areas under inspection, the barium paste should be tried. Very careful screen examination, in addition to skiagraphy, is essential. The patient is examined in the upright left oblique position, to begin with. This position brings into view the œsophagus in the greater part of its course. The swallowed barium is followed in its passage through the œsophagus, particular attention

* The complete paper, including bibliography and x-ray plates, appeared in *Surg., Gynec., & Obst.*, May, 1928.

From the Gastro-Intestinal Clinic, Department of Medicine, Royal Victoria Hospital, Montreal.

being paid to the manner of its entry into the stomach. There is frequently partial or complete arrest of the barium at the cardia, and, in the case of fungating tumours of the lesser curvature near the cardia, a forking of the barium stream, or a tumour-shadow, silhouetted against the background of the gas bubble, may be disclosed. When complete arrest of the barium occurs at the lower end of the œsophagus, in spite of taking small quantities at a time, spasm of the cardia or of the œsophagus is diagnosed. Absence of marked dilatation or tortuosity of the œsophagus will tend to rule out true cardiospasm as opposed to spasm of the œsophagus. Smoothness of the contours of the lower end of the barium-filled œsophagus does not rule out malignancy, since spasm occurring on the oral side of a lesion may be situated in an entirely normal portion of the œsophagus. In idiopathic dilatation the subdiaphragmatic segment of the œsophagus often lies transversely, and is directed to the left, while in carcinoma it follows an almost vertical direction, and there does not occur any greater lateral deviation to the left than that usually present. The triangular space, formed where the œsophagus turns forward and to the left to enter the diaphragm, is often obliterated in malignancy.

If, in spite of slow sipping, the barium does not enter the stomach, and the œsophagus is not found to be markedly dilated or tortuous, that is, if signs of longstanding obstruction are absent, the patient should be re-examined after the administration of antispasmodics to the limit of tolerance.

Shrinking of the stomach, and its displacement upward and to the left, may be present in scirrhus carcinoma of the stomach. Diminution in the size of the stomach in cancer of the cardia also occurs. Both signs were present in one of the cases reported here.

Absence of the gas-bubble is an important sign. Infiltration of the cardia may give rise to inefficiency of the cardiac sphincter, resulting in escape of the gas normally filling the fundus. Thus, a permanently absent gas bubble is evidence of patency of the cardia and points to the possible presence of infiltration.

The patient should next be examined in the horizontal position. For proper examination of the fundus it is necessary to have the stomach well filled. Normally, the fundus fills the dome of the left diaphragm and lies in close apposition to it. Its upper limit traces a smooth wide arc. Occasionally, this contour is dentate, this appearance probably having the same significance as the dentate appearance of the greater curvature due to contracting of the muscularis mucosæ. This irregularity must not be confused with that produced by a local lesion. In the latter case the irregularity is not regularly dentate and does not follow the sweeping arch of the fundus; the transverse diameter of the fundus is also much narrower than is usual, due to encroachment of

the tumour upon the lumen of the stomach, or to shrinkage in scirrhus forms.

If careful examination, as outlined above, fails to reveal the presence of a lesion, the region of the cardia should then be thoroughly examined. The cardia is not brought into view for careful inspection by ordinary methods of examination. The reasons for this have already been mentioned. O. Ridder advocates the Stuetz position. The stomach is filled with gas, and the patient fluoroscoped in an oblique position, the rays being directed from the right, posteriorly and above, to the left anteriorly and below. An unobstructed view of the cardia and terminal œsophagus is obtained in this manner. According to Paluguay, carcinoma of the cardia can be recognized even in cases showing but little change in the stomach wall, but in which the normal cardiac mechanism is disturbed. There is a persistent trickling of barium through the cardia, and, as a rule, the outlines of the opaque meal, as it passes through the cardia, are seen to be irregular and jagged. It is only, however, the irregularity of the contrast silhouette in the region of the cardia, with the patient in the Trendelenberg position, that can be considered as direct x-ray evidence. In cancer of the cardia the upper pole of the stomach is frequently an unusually great distance away from the diaphragm.

The direct signs of gastro-œsophageal cancer are:—

1. A tumour shadow bulging into the gas-bubble.
2. Irregularity of the barium contour as it passes through the cardia.
3. Splitting of the barium stream on entering stomach.

The indirect signs are:—

1. Spasm of the œsophagus or cardia.
2. Disturbance of the cardiac mechanism.
3. Absence of the gas-bubble.
4. Shrinking of the stomach.
5. Drawing of the stomach upward and to the left.
6. Increased distance between the upper pole of the stomach and the diaphragm.
7. Narrowing of the fundus.
8. Obliteration of the triangular space mentioned above.

CASE 1

I. H., male, aged 40 years, was first seen on May 18, 1925. He complained of difficulty in swallowing solid food, belching of gas, anorexia, loss of weight, marked salivation, and hoarseness of voice. In June, 1924, he complained of indefinite gastric symptoms and some difficulty in swallowing solid food. At the same time, the condition was diagnosed as duodenal ulcer, on indirect x-ray evidence. In spite of treatment the symptoms became more troublesome, particularly the difficulty in swallowing. The history of the next few months can be summarized as follows: the patient became progressively worse, and was, during this period, examined *de novo* by several physicians and a diagnosis of cardiospasm was made in all instances. The condition had progressed without remissions.

At the time of examination, no solids could be taken. There was no vomiting, pain, or regurgitation of food. Belching of gas and marked anorexia were prominent symptoms. The patient had lost twenty pounds in weight. He had always led a continent life, and had been in good health until the summer of 1924.

Physical Examination.—The patient was a well developed male, somewhat pale, with evident loss of weight. The pupils reacted to light and accommodation. There were many carious teeth; the tongue was coated. No palpable supraclavicular glands were present. The lungs were negative. The pulse was 84, regular, of good volume and tension. Blood pressure: systolic 125, diastolic 80. The heart was negative. The abdomen was full and soft; no organs or masses were palpable; there was no tenderness. Lymphatic, genitourinary, and nervous systems were negative. Rectal examination was negative, except for hemorrhoids. Urine; negative. Stools; occult blood on several occasions. The blood Wassermann test was negative.

Gastric analysis: the tube failed to enter stomach. Bougies were passed without difficulty as far as 45 cm. from the teeth. No obstruction was met with until the cardiac end of the œsophagus was reached.

Direct œsophagoscopy, July 2, 1925. **Diagnosis:** stricture of the œsophagus. The pathological report on biopsy specimen taken from the lower end of the œsophagus, ran as follows: "There is no definite evidence of inflammatory reaction or of neoplastic proliferation."

X-ray: The patient was instructed to swallow barium in small sips. There was some delay at the cardia; the œsophagus was only slightly wider than normal. The lower end of the column of barium in the œsophagus showed a fine irregularity. Barium entered the stomach in constant small trickles and was caught in a small irregularity of the gastric wall on the lesser curvature just below the cardia. The retained barium remained there throughout the examination. The stomach was very small and lay entirely to the left of the spinal column. In the horizontal position, a walnut-sized filling defect was seen on the lesser curvature near the cardia. This defect corresponded with the area of irregularity observed in the upright position.

On the grounds of persistent dysphagia without remissions, the presence of blood in the stool, and the x-ray findings, diagnosis of carcinoma involving the lesser curvature and œsophagus was made.

Three months later, because of increasing difficulty in taking nourishment and the resulting marked emaciation, surgical intervention was decided upon. The operation was performed on August 27, 1925. ". . . It was with difficulty that the dome of the diaphragm was reached. There was a suspicious hardness around the lesser curvature of the stomach and the celiac axis, probably invasion from the lower œsophageal growth. The fundus of the stomach was firmly fixed. . . ." A Witzel gastrostomy was done. A snipping from the lower end of the œsophagus was reported as "undoubtedly carcinoma"; one from the growth of the lesser curvature was too small for diagnosis.

The patient did well for some time, then gradually declined, and died on November 26, 1925.

CASE 2

S. H., male, aged 45; first seen June 1, 1926.

Complaints.—Pain behind the lower end of the sternum, on eating; difficulty in swallowing solids, accompanied by pain; eructation of gas associated with pain; increased salivation; loss of weight; loss of appetite.

Present Illness.—Began two years ago. He complained first of a little pain behind the lower end of the sternum with every meal. Frequently, only the first swallow brought on pain and the pain disappeared with the taking of additional food. The pain did not

radiate and it was relieved by bicarbonate of soda. Gas eructations occurred, but no nausea or vomiting. The condition persisted for about two months and was followed by a remission of two months. During the subsequent eighteen months the patient suffered from recurrent attacks of pain, coming with the first swallow and disappearing with the taking of additional food. During the past six months the pain had increased in severity and was not relieved by food or medicaments. At the time of examination the patient complained bitterly of the pain behind the sternum, which now came through to the back, and of painful gas eructations. Increased salivation was quite marked and a very troublesome feature. The appetite was poor, and because of the pain the patient feared to eat. The bowels were sluggish; there was at no time diarrhœa or melena. The weight had gone down from 130 to 112 lbs. during the course of the illness.

The patient had undergone three complete and separate examinations, with the following results: March, 1926: duodenal ulcer. He was put on a Sippy diet; was better for two weeks, but subsequently the symptoms returned. April, 1926: the examination was entirely negative for organic disease. The case was diagnosed as gastric neurosis. May, 1926: spasm of the lower œsophagus.

Personal History.—The patient had suffered from asthma and constipation for twenty years. The asthma was cured two years ago. With these exceptions he had always been well.

Family History.—Negative.

Physical Examination.—The patient showed marked loss of weight, but was not cachectic. The pupils reacted sluggishly to light and accommodation. There were several capped and carious teeth and a moderate degree of pyorrhœa; the tongue was coated. Circulatory system: Pulse 100, regular, of fair volume. Blood pressure: systolic 130, diastolic 80. Heart and lungs were negative. The abdomen was flat. There was slight tenderness over the entire abdomen. No masses or organs were palpable. The lymphatic, genito-urinary, and nervous systems were negative. Rectal examination was negative.

Gastric analysis: Fasting contents 10 c.c.; no food remnants; no blood. Free HCl was 0; total 16. At the end of one hour free HCl, 20; total, 40.

The urine was negative. Stool, dark brown, formed, with a faint trace of occult blood. The blood Wassermann test was negative. Blood: hæmoglobin 90 per cent; red cells 4,900,000 per c.mm.; white cells, 7,200.

Esophagoscopy: A specimen taken from the lower end of the œsophagus revealed inflammatory cells and a few suspicious cells, but no definite evidence of carcinoma.

X-ray: The barium suspension entered the stomach without being delayed at the cardia. The fundus was narrow and rigid. The barium could not be forced into it by pressure from below; a small quantity remained caught, and was distributed in an irregular manner in the fundus. The gas bubble was absent, but as the patient swallowed, a little air was seen in the fundus; this, however, quickly left the stomach and was belched up. Whenever this happened, the patient complained of pain behind the sternum. Peristalsis was active. The duodenal cap filled well. The stomach was empty in six hours. Examination of the colon revealed 72 hour stasis. **Diagnosis:** infiltrating growth of the fundus, involving the cardia and causing insufficiency.

On July 29, 30 and 31st, the patient passed tarry stools. By this time he was confined to bed, and had lost considerable weight; he was taking very little food because of the pain and was losing ground rapidly. On August 5th, a Witzel gastrostomy was done. Operation revealed carcinoma of the fundus, involving the cardia, and extending posteriorly to the

spine, and adherent to it. The patient did not stand the operation well, and died on August 31, 1926.

CONCLUSIONS

In both cases errors in diagnosis were made several times. A survey of the literature on the subject reveals the fact that such errors are quite common. The apparent reasons for this have already been considered. If it is kept in mind that lesions of the cardia may give rise to oesophageal and gastric symptoms, and lesions of the fundus to oesophageal symptoms, much could be accomplished toward diminishing the number of undiagnosed cases, and toward making a correct diagnosis earlier.

Carcinoma of the fundus may give rise to oesophageal symptoms only. Such cases are particularly liable to cause errors in diagnosis, since all attention is centred on the oesophagus. Investigation reveals nothing but the presence of oesophageal spasm, and the disease is labelled "functional." Oesophagoscopy may reveal a little irregularity or bulging of the mucosa, but a specimen, taken even from an advanced case, may show no signs of malignancy. The spread of carcinoma is submucous, and unless a negative specimen includes a portion of the submucosa, no value can be attached to the findings. Lesions of the fundus may, by extension, involve the oesophagus, and those of the oesophagus may in a similar manner involve the fundus. Evidence is not lacking that the cardia does not serve as a barrier to the advance of malignant growths, either from the fundus upward or from the oesophagus downward. Furthermore, there is anatomical evidence that such extension does occur, and is quite frequent.

Malignant disease of the gastro-oesophageal junction is so unlikely to be limited to only one of the three situations under discussion, either in actual organic involvement, or in the development of symptoms, that it appears to be unwise to speak of carcinoma of the fundus, of the cardia, or of the last portion of the oesophagus. There appear to be sufficient grounds for referring to cancer of these areas as gastro-oesophageal cancer. A further advantage in the use of this term is that it simplifies the problem of classification, and incidentally makes the literature on the subject more readily available. The use of such nomenclature is sanctioned by precedent—*e.g.*, the term ileo-caecal tuberculosis.

SUMMARY

1. About 15 per cent of all malignant lesions of the stomach are situated at the fundus or cardia.
2. There is no definite symptom-complex pathognomonic of carcinoma of the fundus or cardia.
3. The tendency of malignant lesions of the cardia and fundus to give rise to gastric and oesophageal symptoms, respectively, is responsible for errors in diagnosis.
4. Dysphagia is the most important symptom,

and may not be directly due to the lesion, but to an associated spasm. A slowly developing dysphagia, progressively becoming worse, with remissions occurring early, if at all, is strong evidence in support of a diagnosis of malignancy.

5. Loss of appetite, gas eructations, and pain are the most frequent and early symptoms, but they are present in so many other conditions that they acquire only secondary importance.

6. Malnutrition, cachexia, and loss of weight are late manifestations, and their absence does not constitute evidence against malignancy.

7. Enlarged supraclavicular glands are rarely present, and if present occur late.

8. Achylia and anaemia are not reliable signs, but are of secondary importance. If present, anaemia is a late manifestation.

9. Occult blood in the stools is an almost constant finding.

10. Oesophagoscopy is of little or no value as an aid to diagnosis, except in carcinoma beginning in the lower oesophagus, particularly in the presence of malignant ulceration.

11. The most important method of diagnosis is careful radioscopic and radiographic examination in all positions. The direct and indirect signs are enumerated.

12. The use of the term gastro-oesophageal carcinoma is suggested for malignant lesions involving primarily the terminal oesophagus, cardia or fundus.

ULTRA VIOLET RADIATION FOR THE GENERAL PRACTITIONER

By R. KING BROWN, B.A., M.D., D.P.H.

(III)*

In this article I propose to deal briefly with the question of lamps as a source of ultra-violet irradiation. I shall not discuss the question of the best type of lamp to use from a purely scientific point of view, especially as the question from that aspect has by no means been settled, though many scientific investigators and clinicians have been and are still working at the matter. Further, as I intend my remarks to refer rather to the requirements of the general practitioner, and not to the hospital or public clinic, where the question of the consumption of electricity is not of such first importance, the economic side of the question will take a paramount, or at least an equal, place with the scientific side.

Most large hospitals generate their own current, and other clinics are assisted on the economic side in various ways, *e.g.*, out of voluntary funds, or by subscriptions or, in the municipal ones, out of the rates. With the general practitioner the matter is on a totally different footing. For reasons of space, time re-

* Article I, *Canad. M. Ass. J.*, March, 1928, xviii, 326; Article II, *Ibid.*, April, 1928, xviii, 465.

quired for supervision, the number of patients who can be treated simultaneously or within a given time, and the amount of current consumed, the type of lamp is most important. Provided he can be guaranteed a sufficient output of ultra-violet rays for his purpose, the purely scientific question of the close similarity or divergence of the spectrum from that of the natural sun is of secondary importance.

TYPES OF LAMPS

Lamps can be broadly divided into two main types, viz., (1) the open arc, and (2) the mercury-vapour lamp.

In the former there are two electrodes, and the current, in bridging the gap between the upper and lower electrode, produces a powerful flame which gradually burns up the ends of these. The variations in this type of lamp are usually due to variation in the composition of the electrodes. They may consist of pure carbon (upper and lower) which is a very common type; or the carbons may be impregnated with various metals such as sodium, magnesium, potassium, iron, tungsten or aluminium, or the cores may consist of the latter metals; or the electrodes may both consist of iron or tungsten, or one of the electrodes may be of iron or tungsten and the other of carbon. Sometimes pure tungsten is used, or more commonly an alloy, as pure tungsten is very expensive.

The carbon arc has been specially developed by the Finsen Light Institute of Copenhagen. The chief argument in its favour is that it produces a continuous spectrum more like that of the sun than any other type of lamp, and that consequently the output of ultra-violet rays, compared with the luminous and heat rays, is better balanced, thus obviating the necessity of supplementing the first-mentioned by lamps producing mainly yellow, red and heat rays. Carbon arcs, besides, do not deteriorate by using; the carbons, it is true, burn out, but as long as they are active the output of rays remains practically constant.

Against these advantages you have the large consumption of current. In the more powerful types 30 to 75 amps (3 to 7 B.T.U.) per hour are required, and in the smaller type proportionately less, 15 to 25 amps ($1\frac{1}{2}$ to $2\frac{1}{2}$ B.T.U.) being a common consumption. Another disadvantage is that they cannot be used in the open air as every draught disturbs the flame and causes the lamp to splutter a good deal. The tungsten arc produces a very large proportion of ultra-violet rays, but the electrodes are very expensive and require frequent renewal. It is a small lamp, simple in construction, but only adapted for special uses, and as I am considering the question of lamps more for general use, it need not be referred to again.

The second type of lamp referred to above is known as the mercury-vapour lamp. The mercury-vapour acts as a bridge of high resistance between the positive and negative poles, becomes intensely hot, and gives out a powerful light in which violet, indigo and green largely predominate in the visible spectrum, while the proportion of ultra-violet rays compared to the visible is very much greater than in the case of the carbon arc, more than 20 per cent of the ultra-violet output being between 3,900 A.U. and 1,850 A.U. The mercury is generally contained in a sealed quartz tube burner, and the current (which must, as a general rule, be in one direction only) passes from the positive to the negative pole. If an alternating current be used it must be partially rectified so as to insure that it is unidirectional. There is another type in which the quartz tube is open to the air, with a suitable arrangement to prevent the mercury-vapour from getting into the air of the room. This type is said to be more easily cleaned and not to deteriorate so rapidly as the sealed form. A good representative of the former is the Hanovia quartz mercury-vapour lamp, and of the latter the K.B.B. (Kelvin, Bottomley and Baird) lamp. Both these lamps are air-cooled, but there are also water-cooled M-V lamps, such as the Kromayer. The lamp is cooled so that it may be pressed against the skin and the blood squeezed out, enabling the U.V. rays to penetrate more deeply in some cases.

The air-cooled sealed quartz mercury-vapour lamp is most used on the Continent, especially in Germany, where its properties have been and are still being carefully investigated. In a recent visit to Munich, Berlin and Hamburg, we found this type of lamp almost exclusively used in hospitals, public and private clinics.

The advantage of the mercury-vapour lamp of whatever type is that it only uses about one-fourth to one-fifth or less of the current required for the carbon arc, i.e., 3 to 5 amps per hour ($\frac{1}{4}$ to 1 B.T.U., or $\frac{1}{2}$ d. to 2 d. of electricity at 2d. per unit power per hour), as against 10 to 75 amps. per hour (1 to $7\frac{1}{2}$ B.T.U., or 2d. to $1\frac{1}{3}$ per hour) for the latter, according to the size of the lamp. As stated above, the spectrum is very rich in ultra-violet rays, but the intensity or quantity, as distinct from the quality, of the different parts of the spectrum differs greatly both from that of the carbon arc and the sun. The range of ultra-violet light wave-lengths is much greater than that of the sun even on our highest mountains, but their intensity in proportion to the light rays below the green and the infra-red given out by them far surpasses the carbon arc or the sun. The intensity of their ultra-violet rays is also very uneven, certain groups being much more intense than others.

Peemöller shows this in another way. If you

take the Dorno rays, which are important therapeutic rays and lie between 3,132 and 2,894 A.U. in a mercury-vapour lamp at 220 volts, alternating current (the strongest medical U-V lamp so far made as a 100 per cent unit) and test them with the Dorno cadmium cell you get the following results:—

1. Mercury-vapour lamp (artificial alpine sun; 220 volts, alternating current)....	100%
2. Peemöller lamp; carbon arc, aluminium core, carbons horizontal	72.4%
3. Mercury-vapour lamp; (110 volts direct current, artificial alpine sun).....	44.3%
4. Peemöller lamp; carbon arc, cal. core, carbons vertical, max.	43.5%
5. Carbon arc; iron core.....	14.1 to 33.2%
6. Old carbon arc with wick and homogeneous carbons	9.2%

Owing to the high intensity of the ultra-violet rays in the quartz mercury-vapour lamps the exposures to them are only about a quarter or less of those required by the carbon arc to produce an erythema. Thus, doses of from 1 to 5 minutes, according to the condition of the patient as to pigment, use, etc., will correspond to from 5 to 25 minutes of a carbon arc. It is evident therefore that with the mercury-vapour lamp we have shorter exposures and can get through

a much larger number of patients in a given time. It is probably these factors which largely determined the preference of German and other continental workers for this type of lamp. Owing to their poverty in yellow, red and heat rays, some clinicians make use of a heat-producing lamp—of which there are a number of useful models on the market—simultaneously with or immediately preceding the M-V lamp, so as to intensify the action of the latter. The method of using this will be discussed when we come to speak of the use of the lamp in disease in the next article.

One disadvantage of the M-V lamp is that the quartz burners when new give off much more intense ultra-violet rays than when they have been a long time in use, owing to a rearrangement of the molecules of the quartz. When, therefore, they have been in use from 1,000 to 2,000 hours, they should be reburned. This is a somewhat expensive process and costs £3 or £4.

In the next article a short account of the technique of using the lamps will be given, and the diseases in which they so far have proved useful. (*The British Journal of Actinotherapy*, May, 1928, iii, 32).

Men and Books

RICHARD MEAD: A FATHER OF PREVENTIVE MEDICINE

By W. H. HATTIE, M.D.

Halifax

In the summer of 1696, a new doctor made his appearance in Stepney, a young man who had just returned to his native town after six years of study at Utrecht, Leyden, Florence, Padua, Naples and Rome. At Leyden he had been the intimate friend and fellow student of Boerhaave. At all the places visited he had associated with men of various professions and had had opportunity to gratify and develop a native taste for literature and art. At Padua he had obtained the degree of Doctor of Philosophy and Physic. He had come back to England with a naturally engaging personality quite unspoiled, and able to adapt himself gracefully and easily to any social or other situation which might develop. Moreover, he was sagacious enough to appreciate the value of cultivating certain aids to success. And so he quickly acquired a clientèle and a reputation, and, as he found himself able to move from his original locale at Stepney to more and more

consequential locations, he came to be much discussed in medical and other circles.

Radcliffe, still in high fame and still crude in his bluntness, decided that this young man should be subjected to a crucial test. A dinner party was arranged and the aspiring young man was brought into the company of Radcliffe's most bibulous friends. The intention was to bring humiliation on him by making him highly intoxicated in the presence of his professional elders. But the young man was more wary than his elders, and presently the whole party with the exception of Radcliffe and his youthful guest were under the table. Any aversion which Radcliffe may have entertained vanished at once. "Mead," he exclaimed, "you are a rising man! You will succeed me!" Note now that Radcliffe was vain and Mead adroit. "That, sir, is impossible," Mead replied, "You are Alexander the Great, and no one can succeed Radcliffe. To succeed to one of his Kingdoms is the utmost of my ambition." "By the gods," said Radcliffe, "I'll recommend you to my patients!" And so the evening ended happily.

Next day Radcliffe called at Mead's office and discovered him reading Hippocrates. "Do you read Hippocrates in Greek?" he thundered.

Modestly and fearfully Mead admitted that he did, greatly dreading that his scholarship would prove offensive to the great man. Radcliffe's air was sullen as he said: "I never read him in my life." But Mead was again ready. "You, sir, have no occasion. You are Hippocrates himself." The peril was past, and Mead was secure in Radcliffe's affection.

With this introduction to Richard Mead, let us investigate him a little further. He was born at Stepney, August 11, 1673. His father, Rev. Matthew Mead, a nonconformist minister and a writer on theological subjects, had been ejected from his charge some eleven years before, but possessed sufficient private fortune to maintain his family and to continue his ministrations to the nonconformists of Stepney. Eleven years after Richard's birth, the Reverend Matthew was suspected of designs against the government, and fled from Stepney to the safer place known as Holland. Up to this time, Richard had been tutored by another nonconformist minister (John Nesbitt), and now he was sent to a classical school kept by a former second master of Eton, Thomas Singleton, likewise a nonconformist. Under Singleton, Richard acquired a thorough grounding in Latin and Greek. At the age of seventeen he went to Utrecht, and, three years later, to Leyden. On completing his academical studies, he accompanied two celebrated gentlemen, (of whom one, Dr. Thomas Pellett, later became President of the College of Physicians) on the journeyings to which reference has already been made. Thus prepared, he returned to Stepney and to the house in which he was born, to begin his professional career and to associate himself closely with nonconformists.

Early in 1703, when he was not quite thirty years of age, he was appointed physician to St. Thomas's Hospital. This made desirable his removal from Stepney to a place more convenient to the hospital. A few years later he was astute enough to secure a house in Austin Friars, just vacated by the death of a busy practitioner. And when Radcliffe died (1714), the circumspect Mead, who had already acquired the major part of his practice, took possession of Radcliffe's mansion in Bloomsbury Square, actually before the burial of Radcliffe from his country place at Carshalton, where he had died. Some days before his death, Radcliffe had presented Mead with the famous Gold-Headed Cane, which afterwards passed in succession to Askew, Piteairn and Baillie, the memoirs of which are so entertainingly related by MacMichael. So Mead succeeded Radcliffe, even as the latter had prophesied.

Mead, now about forty-one years of age, was thus firmly established. In the enjoyment of an income of between £5,000 to £6,000 a year—

in one year it reached £7,000—he was able to indulge his fondness for books and works of art, and to provide liberal entertainment for the host of prominent people who sought his friendship. Of these things we must say more later. Meantime it should be stated that his success was not due entirely to sagacious flattery and an instinct for sensing opportunity for material betterment. Once he had an urgent summons to attend a celebrated Duchess, and arrived at her home a bit unsteady as a result of somewhat free indulgence in the cup that both cheers and inebriates. While feeling her pulse his foot slipped awkwardly, and he confessed aloud: "Drunk, yes, quite drunk!" The Duchess took this to be the diagnosis of her own condition, and told Mead that if he would keep her secret she would recommend him. Her recommendation aided his rise to fame and opulence. But, apart from all fortuity, Mead was a consistently hard worker, reader and thinker. Recognition of his qualities led to great demand for his services as practitioner and consultant. He wrote considerably, and several books have come down to us from his pen. The first of these, his treatise on poisons, appeared in 1702, and "De Imperio Solis et Lunæ in Corpora Humana" in 1704. In 1707 he was diplomated M.D. by the University of Oxford. Among other distinctions were appointment as lecturer in anatomy to the Company of Barbers and Surgeons, membership in the Royal Society, and fellowship in the College of Physicians. In 1744 he was offered the presidency of the college, but declined the honour.

During the last illness of Radcliffe, that physician to royalty was unavailable when Queen Anne lay on her death bed, and Mead was summoned in consultation. It will be remembered that the time was one of much intrigue. Three years before, Anne had wearied of her erstwhile favourite, the Duchess of Marlborough, and the great Duke also presently came into disfavour; the Whigs lost their domination, and the Tories gained the ascendancy at court, although the strength of the two parties was fairly well matched. The Tories favoured the Stuart Pretender; the Whigs looked to Hanover for a successor to the throne. Now that the Queen's demise seemed imminent, partisans of each side hovered about the court. It was important to the Stuart cause that the Queen's life should be prolonged, as the Pretender was abroad, while a representative of the Hanoverian house was on the spot. The court physician, though perhaps fully cognizant of the nearness of death, feared under the embarrassing conditions to tell the truth. Possibly, Mead might have gained favour with the Tories by a discreet silence, but possibly, too, he saw

advantage to the Whig cause (which he espoused) by frank expression of his opinion. At any rate he declared, and made public his declaration, that the Queen would not live an hour. The announcement was fatal to the Jacobites, who, as we have seen, needed time for the maturation of their plans, and who seemingly accepted Mead's verdict as the death knell to their hopes. One historian comments: "It has always been considered that the prompt boldness of this political physician occasioned the peaceable proclamation of George I. The Queen's demise in one hour was confidently predicted by her Whig doctor. He was often taunted afterwards with the chagrin his countenance expressed when the royal patient, on being blooded, recovered her speech and senses." Perhaps the chagrin may have been feigned rather than real. At any rate we see Mead in the rôle of a political partizan, almost that of a king-maker. Those who have read "The Gold-Headed Cane" will remember that Radcliffe, good Tory that he was, was accused of having negatively murdered Queen Anne by declining to attend upon her, and was threatened with assassination. Mead, the Whig, on the other hand, although suspected of having desired her death, does not appear to have incurred any popular disfavour by his association with the affair. This may be taken as further evidence of his adroitness.

One of the notable features of "The Gold-Headed Cane" is that it tells much more of other personages than of the characters it professes to delineate. At the risk of a similar offence, and at the further risk of making this paper too anecdotal, I venture to bring Radcliffe again into the story. Mead had noted that there was no Bible in Radcliffe's house, and was seemingly rather disturbed by the circumstance. In his tactful way he presented Radcliffe with a very beautiful Bible, formerly the property of King William, who had been a patient of Radcliffe's, as a memento of his late Majesty. Radcliffe, much pleased with such a gift, resolved to read the Book, and got as far as the middle of Exodus before his resolution failed. Had he gone farther he might have given his protégé other advice than that given in one of his confidences: "Mead, I love you, and I'll tell you a sure secret to make your fortune—use all mankind ill." We shall see that this advice was not accepted, and Mead chose rather, as much as in him lay, to live peaceably with all men. Other men, however, did not always choose to live peaceably with him. Some, perhaps jealous of his success, lampooned him without mercy. Such usually hid behind anonymity. But Woodward, Professor of Physic at Gresham College, attacked him openly, and in such an insulting manner, that Mead was infuriated and challenged him

to a duel. Accounts differ as to the skill displayed, but Woodward was disarmed and ordered to beg for his life. "Never, till I am your patient," was the happy retort, which so appealed to Mead's sense of humour that the incident was at once ended. Garth's comment on this affair was: "Physicians, if they're wise, should never think of any arms but such as pen and ink."

In our day some at least of Mead's conduct would be considered to justify lampooning, although it was seemingly not regarded as quite unprofessional in his time. Coffee houses were very popular resorts for the gossips of all grades of society, and Mead followed Radcliffe's example by patronizing them and meeting there any apothecaries or other types of practitioner who wished to consult him. In the mornings he went to Tom's, in Covent Garden, and in the evenings to Batson's, in Cornhill, where he would advise such worthies at a half-guinea per consultation; prescribing, therefore, without seeing the patient. His usual fee, for persons in good circumstances, was two guineas. It is related too, that he realized large sums by the sale of worthless nostrums. In other respects he seems to have lived blamelessly, though it is reported that he dabbled in stocks. It is not to his discredit that he was bequeathed two large fortunes.

Mention has already been made of Mead's earlier ventures in medical literature (1702-1704). Seemingly he was so engrossed with other activities that about sixteen years passed after the appearance of "*De Imperio Solis et Lunæ*" before another work issued from his pen, and this followed a request from the government to advise precautionary measures against the plague, then prevalent in France. Fifty years before, plague had caused 90,000 deaths in England, so its return was naturally dreaded. French physicians did not consider the condition to be contagious, and British commercial interests wished this opinion to prevail, but the government was doubtful. So, in 1720, Mead's advice was sought. After investigation he concluded that the condition was contagious, and set forth his opinions in "*A Short Discourse Concerning Pestilential Contagion*," which ran through seven editions in a year. In this he advised strict quarantine against infected countries and the isolation of infected towns, and to this extent was in agreement with the common usage of the time. But the practice of shutting up an infected house with all its inmates for a month after the disappearance of the disease he characterized as futile and cruel, and as favouring concealment. He advised that a Council of Health should be appointed for each town, charged with the duty of removing the sick to a distance of three or four miles from the town, and also of

cleansing and removing and supervising contacts. This was to be done at the public expense. In this we note the rudiments of provision for isolation hospitals and for asylums for contacts. Moreover, he urged cleanliness of streets and houses and avoidance of all unnecessary assemblies. He expressed little confidence in the fumigations which were popular, but made a partial reservation in favour of "the smoke of sulphur," which "abounds with an acid spirit which is found by experience to be very penetrating." Mead is credited as being the first to advocate a rational use of quarantine measures, and is spoken of as the earliest of the "Fathers of Preventive Medicine."

After the appearance of the "Short Discourse," another period of several years elapsed without literary productivity except for new editions of his first books. Meantime he was growing old, and felt the need for relaxation from the stress of so active a practice. He wished, moreover, for leisure to ponder over his experiences and to make use of his pen again. So he retired from much practice, and in 1747 brought out his "Treatise on Smallpox and Measles," written in Latin. He was then nearly seventy-five years of age, but, according to the author of "Lives of British Physicians," "the purity and elegance of style exhibited in this work have attracted the admiration of scholars." More than a quarter of a century before, impressed by the story of Lady Mary Wortley Montague, he had been a strong advocate of inoculation of smallpox, and had (1721), at the instance of the then Prince of Wales, afterwards George III (to whom he was appointed physician), experimented successfully upon several condemned criminals, who were pardoned after the demonstration. He and Freind (to whom we shall again refer) had urged that purgatives prevented or mitigated the severity of the secondary fever of smallpox. To this treatise he appended a translation of Rhazes, the only remaining Arabian MS. of whose essay was loaned to him by his friend Boerhaave for the purpose.

In the following year (1748) he published his "Medica Sacra," a literary curiosity which attracted much attention, in which he commented on the more remarkable diseases mentioned in the Bible and stated his belief that the demoniacs mentioned therein were lunatics or epileptics. In 1749, he wrote "On the Seurvy" and, in 1751, "Monita et Præcepta Medica," which is said to be the most important of his works. In this he discussed frankly his reflections upon his own experiences, and gave sage advice on the presentation of health of mind and body. This work is regarded as greatly superior to contemporary works of a similar kind.

It will be noted that much of his effort was in the nature of what we now term public health work. Further evidence of his interest in this field is afforded in his advocacy of a method of ventilating ships, etc., which was originated by Sutton. He interested fellow members of the Royal Society in this matter, and after ten years of persistent effort finally succeeded in inducing the Lords of the Admiralty to have the method introduced in all the ships of His Majesty's navy.

To hark back to his first book, that on poisons, Mead appears in it as one of the early votaries of experimental physiology. He provoked vipers to strike at hard bottles to secure venom, which he injected into the veins of animals. He mixed venom with human blood in an endeavour to prove his theory that the effect of poison was due to mechanical action on the blood, a theory which he abandoned in a second edition of this work, published forty years after the first. He also tasted snake venom, in order to learn whether or no sucking a snake bite would be dangerous.

Mead was on intimate terms with the more noted of his medical contemporaries, notably Garth, Arbuthnot, Freind, Sloane and Cheselden. Seemingly, he often demanded that Cheselden should be associated with him in consultation, especially if surgical questions were involved. We get an indication of this in these lines of Mead's intimate friend Pope:

"Weak though I am of limb, and short of sight,
Far from a lynx, and not a giant quite,
I'll do what Mead and Cheselden advise,
To keep these limbs, and to preserve these eyes."
—Pope, (*Imitations of Horace*).

But Mead's interests were by no means restricted to medicine. As has already been said, he had a great love for literature, for art, and for antiquities, and was an enthusiastic collector in all these lines. Some time after moving from Radeliffe's old house to a very pretentious residence in Ormond Street (1719), he added a gallery for the accommodation of his library and museum (1732). This was a meeting place for all types of celebrities from all parts of the world, and "The Gold-Headed Cane" tells of some of these gatherings. Mead's linguistic accomplishments enabled him to converse with practically every visitor from abroad, if not in his native language at least in one with which both were acquainted. This fact, together with the certainty that a brilliant company would be met there, doubtless accounted in part for the extraordinary attraction of Mead's house for distinguished visitors to London. As he was well known to the literati, the antiquarians and the art lovers of Europe, with many of whom he was in correspondence and with whom he exchanged curios and rarities, he would be well

advertised abroad. At least two of the crowned heads of Europe, the Kings of France and Naples, contributed to Mead's collection. The author of "Lives of British Physicians" (1830), tells us that Mead's "collection of statues, coins, gems, prints and drawings will probably forever remain unrivalled among private amateurs." In his library were to be found the most rare and ancient works, Oriental, Greek and Latin manuscripts forming no inconsiderable part. His pictures alone brought £3,400 at the sale after his death. He kept constantly in his employ several scholars and artists, who laboured at his expense for the benefit of the public. For his motto was: "Non sibi sed toti." He "excelled all the nobility of his age and country in the encouragement which he afforded to the fine arts, and to the study of antiquity." (Lives of British Physicians). So it is not surprising that his house should have been a favourite place with those of artistic and intellectual tastes.

One of the pleasantest of the parties which met there is described by "The Gold-Headed Cane." Freind, who was a member of parliament had been sent to the Tower on being suspected of sympathy with Bishop Atterbury in his activities in behalf of the Stuart cause. Mead had been active in the endeavour to secure his release, but it was not until Sir Robert Walpole called him professionally that he made real headway. He would treat Walpole only on condition that Freind be given his liberty. And so it happened that the History of Medicine which Freind had commenced to write during his imprisonment was destined to be continued in more advantageous surroundings. On the evening of the day following his release, a large and distinguished party gathered at Whig Mead's to celebrate Tory Freind's return to the world, when Mead presented Freind with the fees he had collected from the patients of the latter whom he had attended in his absence, amounting to more than 5,000 guineas.

Mead not only contributed freely to the institutions in which he was interested, notably the College of Physicians (for which he had executed the well-known bust of Harvey) and the Foundling Hospital, but his charity was unbounded, and he was ever ready to give his

services gratuitously. Among those who benefited by his free ministrations was a clergyman, a personal friend who officiated at one of Mead's marriages. After the ceremony this gentleman slipped away unnoticed, and Mead sent his brother to him with a handsome fee. To this the clergyman reacted as follows:

"To the Doctor, the Parson's a sort of a brother;
And a good turn from one deserves one from the other;
So take back your guineas, dear Doctor, again;
Nor give—what you so well can remedy—pain.
Permit me to wish you all joy and delight,
On th' occasion that brought us together to-night;
May health, wealth and fame attend you through life,
And ev'ry day add to the bliss of your wife."

Nor was Mead content with being himself a benefactor, but he influenced others to contribute of their substance to various good works. Conspicuous in this particular was his success in persuading Thomas Guy to spend much of his fortune in building of the hospital which bears his name.

It is not surprising that one of such artistic tastes should be inclined to live extravagantly. In addition to his elaborate city house, Mead maintained a country place near Windsor, to which he drove in a coach and six. He spent so freely and gave so generously that, notwithstanding the many years in which he enjoyed a large income and the legacies he had received, his estate netted only about £20,000.

Towards the end of his long life, his eyesight failed, and his physical and mental powers waned, but fortunately death came soon after these deprivations. He died on the 16th of February, 1754, at the age of 81, after five days of confinement to bed. He was buried in the Temple Church. In Westminster Abbey and in the Royal College of Physicians may be seen busts, suitably inscribed, of this wonderful man.

After his death, it was said of him, to quote The Gold Headed Cane, "That of all physicians who had ever flourished, he gained the most, spent the most, and enjoyed the highest fame during his lifetime, not only in his own but foreign countries." And his contemporary and friend, Samuel Johnson, declared: "Dr. Mead lived more in the broad sunshine of life than almost any man."

The city of Nurnberg, among its many distinctions, may claim to have been the place of publication of the first pharmacopœia, which was compiled in 1535 by Valerius Cordus, after consultation with the physicians

of the city. This work, at first restricted to galenicals, went through several editions. That of 1613 was revised by Minderer and was the first to admit mineral preparations.

Provincial Association Notes

THE ANNUAL MEETING OF THE ONTARIO MEDICAL ASSOCIATION

The forty-eighth annual meeting of the Ontario Medical Association was held at Kingston on May 29, 30, 31, and June 1, 1928, and was attended by 525 physicians and their wives.

The first day, Tuesday, was devoted to business of the Committee on General Purposes, there being fifty-two representatives present from all parts of the province.

The Inter-Relations Dinner was held on Tuesday night, and was attended by about one hundred. Dr. Geo. Ramsay was in the chair. Following the dinner, discussion for about two hours centered on the following topics:

- Medical publicity.
- Periodic health examinations.
- Health insurance.
- Workmen's Compensation Board problems.
- Complete medical service at low cost to people of moderate means.
- Establishment in Canada of the Primary Examination of the Royal College of Surgeons of England.
- Establishment of a College of Physicians and Surgeons of Canada.

The conference was one of the most successful which has yet been conducted by the Committee on Inter-Relations.

On Wednesday, Thursday and Friday mornings, the scientific programme was presented in general sessions, with thirty-eight speakers taking part.

On Wednesday afternoon, the Association, as guests of the Mayor and Council of Gananoque, enjoyed a trip down the St. Lawrence River through the Thousand Islands.

On Wednesday night, the annual Association Dinner was held at the LaSalle Hotel, when the address of the retiring President was delivered by Dr. Weston Krupp, of Woodstock. After the dinner, the members spent a very

pleasant evening dancing and playing bridge.

On Thursday afternoon, a delightful tournament was given by the cadets of the Royal Military College, through the kindness of Colonel-Commandant Constantine. After the tournament, the Nurses Alumnae Association of the Kingston General Hospital served tea at the Nurses' Home.

On Thursday evening the ladies were entertained at a most enjoyable musicale, the hostess being Mrs. F. Etherington, while the men attended Alumni Dinners and Class Reunions.

On Friday afternoon, a delightful garden party was held at Rockwood House, the home of Dr. and Mrs. Edward Ryan.

From the point of view of scientific program and entertainment, the meeting was an excellent one. The papers presented were generally of a high order, and the discussions were full and illuminating. Special reference may be made to the presentation of a moving picture film on the subject of the growth of tumour cells *in vitro* and the effect of radium thereon, prepared by Dr. R. G. Canti of London, England. This proved a most remarkable demonstration of the vital forces of cells which made easier the understanding of the complicated subject of growth. This exhibition attracted much attention, and was highly appreciated.

President—Dr. E. A. McQuade, Trenton.

First Vice-President—Dr. A. J. Grant, London.

Second Vice-President—Dr. Ward Woolner, Ayr.

Honorary Treasurer—Dr. G. Stewart Cameron, Peterborough.

Secretary—Dr. T. C. Routley, 184 College St., Toronto.

Counsellors—Dr. J. D. Curtis, St. Thomas; Dr. A. J. McGanity, Kitchener; Dr. Malcolm Stalker, Walkerton; Dr. J. H. Holbrook, Hamilton; Dr. Garnet McLean, Woodbridge; Dr. F. C. Neal, Peterborough; Dr. L. J. Austin, Kingston; Dr. W. S. Lyman, Ottawa; Dr. W. J. Cook, Sudbury; Dr. J. C. Gillie, Fort William.

Reports of Societies

NARCOLEPSY

At a meeting of the Section of Medicine of the Royal Academy of Medicine in Ireland on May 12th, the President, Dr. G. E. Nesbitt, showed a woman, aged 29, married, with three healthy children, who exhibited typical symptoms of the remarkable condition known as narcolepsy.

Dr. Nesbitt said that he was indebted to Dr. Kinnier Wilson, whose graphic description of three cases he had heard last year, for ability

to recognize this case. The patient presented herself at his out-patient department with a history of five or six years of attacks of "loss of power in herself," during which she became excited or laughed. These attacks were followed by an uncontrollable desire to sleep. She had had no illness of importance till she contracted influenza during the 1918-19 epidemic. Some time afterwards she struck the top of her head violently against the frame of a low door. This was followed by almost con-

stant pain in the head, which she described as "terrific," and which was said to have been relieved last year by a visit to a holy well. Soon after the injury the other attacks began, and had persisted since. Dr. Nesbitt added that the patient was a very intelligent woman; she gave a most picturesque and striking account of her curious affection, which she had previously despaired of making anyone understand, and she also quite appreciated its occasionally humorous aspect. A strong emotion, particularly laughter or mental absorption, but not fright, caused her to "flop" in a heap; her eyes shut and her head dropped. She lost all power in her limbs, and behaved "like an infant child when you stand it on the ground." Before she actually fell to the ground the attack passed off, but it recurred quickly, each time more severely. She finally had to sit down on the footpath or wherever she happened to be, and had the greatest difficulty in getting home. She felt exhausted and must get home to sleep, which she did for a variable period up to several hours. She had difficulty in rousing herself if she was disturbed during the sleep, but could do so by a strong effort. If awakened too soon there would be another attack. She sometimes suffered from attacks when she went to bed at night, but these were slightly different in character from the day attacks, probably due to the fact that she was already in bed. When the attacks occurred in the daytime she did not have them at night, and she was not able to bring one on voluntarily. No abnormal

physical signs had been so far detected in the case, which appeared to be one of the so-called idiopathic narcolepsy. Some theories of the disease were then discussed by Dr. Nesbitt, including its relation to Pavlov's theory of sleep. He added that an excellent summary was to be found in *Brain*, Part 3, vol. xlix (1926) by W. J. Adie, who stated that the published cases numbered only about forty in all.

Dr. E. T. Freeman referred to a paper, by Sir James Purves-Stewart, in which it was suggested that the pituitary gland had some connection with narcolepsy. Dr. Brian Crichton mentioned the case of a girl whose father had contracted encephalitis lethargica; about six months later she had developed curious symptoms. When amused she was unable to control the facial muscles, and she constantly dropped asleep while sitting in a chair. He raised the question of prognosis in these cases. Dr. C. Murphy, referring to treatment, asked if Dr. Nesbitt thought that bromide and luminal, which were so efficacious in the treatment of cases of epilepsy, would be useful in cases of narcolepsy.

The President, replying said that he thought Dr. Crichton's case was one of narcolepsy. The treatment was very unsatisfactory. Bromide, luminal, and all medicaments for epilepsy were unavailing, and treatment by suggestion also was useless. He had recently read of a case which had been treated by strychnine, opium, and caffeine, but without any effect.—*Brit. M. J.*, 1928, i, 945.

Correspondence

The London Letter

(From our own correspondent)

The Harvey Tercentenary.—The celebrations in connection with the three-hundredth anniversary of the publication of William Harvey's great work, the *De Motu Cordis*, took place in the week beginning May 14th. Delegates from all over the world were received by H. M. the King at Buckingham Palace and thereafter many receptions and demonstrations took place. Perhaps the most interesting was the "Harvey Film," devised by Dr. H. H. Dale and Sir Thomas Lewis, which showed Harvey's experimental methods of proving his theories as to the circulation of the blood. The film opens with Cornelius Jansen's portrait of Harvey which hangs in the Royal College of Physicians, London, and then goes on to deal in five sections with Harvey's experiments. Auricular ejection, ventricular ejection, passage through the lungs, continuous movement from veins to

arteries and the passages from veins to arteries are demonstrated, as far as possible employing only the simple means available to Harvey. The whole film was perfect in conception and in production and should certainly be shown to all medical students at an early period in their careers.

Many were the speeches and eulogies of Harvey during the celebrations but, for quiet restraint and an admirable summing up of what Harvey did and did not do, the *Times* in its first leader on the morning of May 14th should be accorded high praise. "Harvey began where Galen ended; he swept away much of the rubbish which had accumulated since the glorious days of Greek medicine. Harvey laid no profane hands on any symbol in which the spirit of truth lingered. He brought his new knowledge into the existing structures of knowledge and reanimated existing institutions."

Rheumatic Diseases.—It may seem to readers

of these notes that the subject of rheumatic diseases appears too often, but the many problems connected with this important group of disorders continue to attract great attention in this country. The Ministry of Health has just issued an important report on the provision of treatment for chronic arthritis, and at Bath, during last month, the large attendance of investigators, delegates and distinguished visitors from abroad, at a conference on rheumatic diseases, testifies to the interest shown in this subject. In his introductory address, Sir George Newman, Chief Medical Officer of the Ministry of Health, stated the problem, which was in point of fact how best to organize the campaign for the conquest or control of rheumatism. Out of the many papers which followed emerged many interesting facts divided broadly into those concerned with the social aspects, with the causation of rheumatism, and with the treatment of the disease. In the first place the economic burden of rheumatic infection is very large, and mortality statistics give little or no indication of the harm done to the community. Secondly, while we appear to know little about the exact causation, we know a lot about certain contributory factors and predisposing causes, and it should be possible to organize a "prevention campaign." Thirdly, treatment must be organized in efficiently equipped centres, with specialist "teams" and ample physio-therapeutic appliances. It is perhaps a pity that the acute rheumatic infections of childhood and the more chronic manifestations in adults were discussed at the same conference, for, partly because of the link by name, there is already too much muddled thinking about the connection, if any, between these two disorders. However, the conference was voted a great success and it is hoped that its fruits will soon be demonstrable.

Sunlight and Health.—The month of May, except for its last few days, has been most depressing as far as weather is concerned and the opening of the London "season" has been marked by low temperatures, rain nearly every day, and thunder storms from time to time. It may have been these factors which led the *Times* to bring out on May 22nd a big supplement called "The Sunlight and Health Number." It contains a lot of interesting material, especially about the discovery of vitamins, and the recent work on vitamin D and its preparation from ergosterol receive attention. "The days of darkness" writes the editor, "are also days of death and disease," and charts are shown which indicate the close relationship between the amount of sunlight and a low death rate. From October to March this rate is higher than for the other six months and it is during the summer that we store our sunlight for the winter. "In the early spring the

storehouse is tending to become empty" and it is therefore reassuring, during such weather as we have been experiencing, to know that "bottling sunlight" is an important British industry, and there is already on the market a large choice of ways in which we may keep our health until such time as the English summer, already a subject for mirth, arrives. Hope deferred need no longer make the heart sick, say the experts, if we take enough vitamin D.

ALAN MONCRIEFF

The Edinburgh Letter

(From our own correspondent)

A Famous Criminal Case.—The news of the death of Madeleine Smith in the United States will stir many an old memory, recalling as it does one of the most famous of Scottish criminal trials. Madeleine was the eldest daughter in a highly respected Glasgow family, her father being an architect by profession, living in what was then a fashionable neighbourhood of the city. In 1857, when only twenty-one, she was charged with murdering Pierre Emile L'Angelier, who was ten years her senior, by poisoning with arsenic. L'Angelier was a clerk in a Glasgow office on ten shillings a week. This hopelessly ineligible suitor used to visit Madeleine clandestinely, first in her father's house in India Street, and later at Blytheswood Square. She seems to have been deeply infatuated with him and during their friendship wrote that remarkable collection of letters, which were exhibited in court and proved such a feature of the case. Subsequently she tired of him and wished to end an intrigue that was likely to interfere with the matrimonial plans formulated by her parents on her behalf. L'Angelier threatened to blackmail her by showing the letters he had received from her to her father. Madeleine appeared to take L'Angelier back to favour, and his visits were renewed. On March 23, 1857, L'Angelier died in his lodgings. A post-mortem examination revealed the fact that death was due to arsenic poisoning, 82 grains being found in his stomach alone. Madeleine Smith's letters were found in his rooms. She was arrested and charged with poisoning her lover, by giving him on three different occasions a cup of coffee containing arsenic, through the basement window of the house in Blytheswood Square. At the trial the letters were produced and caused a deep impression, not only by their passionate appeal, but also by their conspicuous merit. The speeches on both sides were brilliant. That by John Inglis, the Dean of the Faculty of Law, in her defence has long been considered a model of excellence. The distinguished beauty of the accused, the despicable character of the deceased, and the fact that poisoning trials are rare in Scotland, stirred public opinion to the

utmost. After a trial which lasted nine days, during which Madeleine was the most self-possessed person in the court, the jury returned the eminently fair and cautious Scottish verdict of "non-proven."

"All Great Britain," states F. Tennyson Jesse in the *Trial of Madeleine Smith*, "was agitated over the trial, and there were three points of view held by three different schools of thought. There were strong pro-Madeleineites who contested that she was innocent, and that L'Angelier had committed suicide; equally strong anti-Madeleineites, convinced that murder had been committed by her, and that she should pay the penalty; a third school, in which probably most students of the case have found themselves ever since, which declared in effect—'Probably she did it, but anyhow he deserved it'."

Madeleine Smith, the chief actress, was possibly the last survivor of that intensely moving drama, the last act of which was fought out in the High Court in Edinburgh. The eminent counsel, the witnesses, the spectators who fought for admission, must mostly have been gathered to their fathers. Yet, still, we meet people who will give you their impressions of the case, (they always seem to have known some one who was present;) discuss the pros and cons, and tell you what they pretend to know is the correct solution of this unsolved mystery. Prejudice dies hard. One meets few Madeleines in Scotland. Even now it is not a popular Christian name to give to a baby girl. And, as though it boded ill-omen, silk, the material she wore during the trial, is said to have suffered a severe slump for many years afterwards. So much for old wives' tales! Whether she did, or whether she didn't, the old lady has guarded her secret well, in the seventy-one years of obscurity which have elapsed since, in all her youth and beauty, and apparently unmoved, she faced her terrible ordeal.

The Royal Edinburgh Maternity Hospital.—It is one of the features of the voluntary hospital system that management committees always seem to be asking for money. At the annual meeting of subscribers of the Royal Edinburgh Maternity and Simpson Memorial Hospital, Baillie, Dr. Nasmyth, in an appeal for funds so urgently needed, pointed out that the number of deliveries in the hospital during 1927 was 2,094, which constituted a record in its history. Taking the total of indoor and outdoor cases last year, the gratifying fact was disclosed that 38.6 per cent, or more than one-third of the whole births of Greater Edinburgh, took place under the supervision of the staff of this old established institution. The antenatal clinics continued to grow in popularity and usefulness. During 1927, 10,000 visits were paid to these clinics. As a natural growth of the antenatal work, the post-natal clinic was now in

action. More than 1,000 visits had been paid to it since its inception in February, 1927, and the results had been most satisfactory. The hospital had maintained its front rank position as a midwifery school. During the year 83 nurses and 287 medical students had been trained. Dr. Nasmyth referred to the proposed amalgamation of the hospital with the Royal Infirmary. The site of the proposed extension of the Infirmary, which is at present occupied by George Watson's College for boys, will not be available for some time, but, when it is, the new Maternity Hospital will occupy one of the finest positions in the city. Dr. Nasmyth asked for a stabilized annual income of £40,000, to enable the hospital to carry on the excellent work in the same manner as it has been doing during the last eighty-three years.

A New Sanatorium.—They never do things by halves in Glasgow. Work is now proceeding on a £500,000 sanatorium, to accommodate 464 patients. Ground for this institution was acquired at a cost of £17,000 at Mearnskirk in 1913. Owing to the outbreak of war the proceedings were interrupted. It is expected that the sanatorium will be completed and ready to receive patients by 1930.

Appointment.—At a meeting of the University Court, Professor Alfred E. Cameron, Professor of Zoology and Entomology in the University of Saskatchewan, was appointed Lecturer in Medical Entomology in the Department of Natural History, as from October, 1928.

Venereal Diseases.—The Edinburgh Corporation Venereal Diseases Bill failed to receive a second reading in the House of Commons. The object of the Bill was to give the Corporation compulsory powers in relation to the treatment of venereal disease, enabling them to deal effectively with defaulters who had failed to continue treatment. The main fear of those opposing the Bill was that compulsion would again drive the disease underground, and ruin all the success of the Voluntary System. Sir John Gilmour, the Secretary of State for Scotland, advised the House to reject the Bill. His speech settled the fate of the Bill, which was defeated by 156 votes to 95. On top of this comes the announcement that the corporation of the City of Glasgow have adopted a Bill for the prevention, notification and treatment of venereal disease. The Bill seeks powers more drastic than the recently rejected Edinburgh Corporation Bill. It was pointed out that compulsory treatment is being gradually forced on local authorities, and it is estimated that there are 100,000 sufferers from this disease in Glasgow, of whom 75 per cent are innocent cases.

Research in Animal Breeding.—The constitution of the animal breeding committee to be set up by the University Court of Edinburgh, in connection with the Department for Research in Animal Breeding, has now been approved by

the Board of Agriculture and the University Court. The University Court have taken over the financial responsibility for the department, and are now taking the necessary steps to constitute the committee. The new institution in connection with the department is on the south side of the City of Edinburgh. There, some thirty acres of land are at present used for the maintenance of experimental animals. The department uses six laboratories in the chemistry building of the University, which is in the immediate vicinity. Lord Woolavinton recently donated £10,000 towards the endowment of a chair of animal breeding in the University. The Department has been in existence on a small scale since 1920, and recently received an offer of £30,000 from the International Education Board, contingent upon a further £30,000 being provided by the University and other private sources. Work has been done in connection with the study of sheep's wool, and experiments have been undertaken to investigate the inheritance of various colours and patterns. A malformation of the limbs of newly born lambs, who either are born dead or die shortly after birth, has been found to be hereditary. An analysis of the Clydesdale breed of horses has been continued. Investigations dealing with superfetation in pigs, and the increase of winter milk production in goats, and various other subjects, have also been in progress.

GEORGE GIBSON

THE MODERN METHOD OF PRESCRIBING

To the Editor:

The contribution of Dr. O. S. Gibbs on the Modern Method of Prescribing in your May *Journal* is of considerable interest to pharmacists.

It is bad enough to have one system of weights and measures for buying and selling and another for dispensing prescriptions, without having all the complications that arise out of differences between the Imperial and American systems in both of these circumstances, and on top of that the metric system in the pharmacopœias.

It would help the situation greatly, and indeed would be a godsend to pharmacy, if medical practitioners would abandon the apothecaries' system and adopt the metric.

Three or four dollars would buy all the metric weights and measures needed for dispensing, and "converting" from one system to another would soon cease so far as dispensing pharmacy is concerned. The chief difficulty arises in the learning of metric doses by prescribers. Every pharmacist is taught the metric system.

The change would not involve as much difficulty as some imagine. It does not take

long for one accustomed to pounds, shillings and pence to learn the value of dollars and cents. The metric system is exclusively used in general science, and is being increasingly employed in medical texts. So much so, that readers who cannot "visualize" metric quantities are under a serious handicap. This would be overcome so far as medical men and pharmacists are concerned in a very short time, if metric prescription writing were to become general.

Your editorial comment on Dr. Gibbs' article seems to imply that the only objection to "single dose" prescriptions is the burden of multiplication placed on the dispensing clerk in the drug store. This burden is more imaginary than real, since it is one of the functions of a dispenser to check the doses of a prescription; he shares with the prescriber in the legal responsibility for any injury that may occur through an excessive dose. Multiplying is surely not more difficult than dividing, which must be done in determining the dosage.

As it is, the dispenser is accustomed to single dose prescriptions in powders, pills, etc., and this type of prescription would be no more difficult in mixtures. It probably would be less of a burden on the dispenser to complete the quantities to be mixed from a single dose prescription than upon the prescriber to complete the quantities to be written for a "multiple dose" prescription.

The former type is more simple and its general adoption where applicable would tend to remove the uncertainty that sometimes occurs as to the quantity a prescriber desires.

G. A. BURBIDGE,
Chairman of Council,

Canadian Pharmaceutical Association

Halifax, May 25, 1928.

INNERVATION AND TUMOUR GROWTH

To the Editor:

In July, 1927, my book "The Cancer Mystery Solved" (London, The C. W. Daniel Co.) was published and on sale. In the book, I show that the nervous system performs a vitally important part in tumour formation and growth, including that of cancers, which are dealt with in "a complete series of comprehensible steps." On the cover of the book occurs the following: "The author of this book claims to have elucidated the origin and nature of cancer, and to have brought to his support evidence strong enough for proof. He shows that the rôle of the nervous system, in cancer production, has been almost entirely overlooked, notwithstanding that cancer only occurs in vertebrate animals."

On February 17, 1928, there appeared in the *Liverpool Echo* an article headed "Nerves in

Human Cancers." "An Important Canadian Discovery." The article was cabled from Montreal, and was stated to be "According to an official statement from the McGill University Pathological Institute." The article went on to show that, according to the statement, Dr. Horst Oertel, Director of the Institute, working with associates, had succeeded in establishing the fact of the presence of nerves in human cancers. "This," says the statement, "has so far not been recognized, and has even been denied by high authorities on cancer."

On February 18, 1928, I sent an explanatory letter, a copy of my book on cancer, and a cutting from the *Liverpool Echo* containing the article, "Nerves in Human Cancers" to a recognized and accepted authority on medical ethics and practice. In his reply, he said, "I have received your letter of the 18th of February with a cutting from the *Liverpool Echo* of the 17th of February, and also a copy of book, 'The Cancer Mystery Solved.' The announcement in the *Liverpool Echo* refers to an official statement from the McGill University Pathological Institute, and to an article by Dr. Oertel, the Director of the Institute, to appear in February issue of *Canadian Medical Association Journal*."

"This statement claims that the presence of nerves in human cancers and other malignant tumours has so far not been recognized, whereas your book, published in June, 1927, deals with that subject in detail."

"In these circumstances I think your proper course is undoubtedly to write to Dr. Oertel, challenging the accuracy of the official statement, and pointing out the real facts."

In the course of his letter, he also advised me that in certain circumstances it might be advisable and necessary to publish my claims in the medical press.

On February 21, 1928, I wrote Dr. Horst Oertel, Pathological Institute, McGill University, Montreal, Canada, challenging the accuracy of the report issued by the Pathological Institute. My letter to him was registered, and I also sent him a copy of my book on cancer by registered post. I have had no reply. Meanwhile, I have had great difficulty in obtaining a copy of the February number of the *Canadian Medical Association Journal*, and have only recently succeeded in so doing. Dr. Oertel's article is entitled "Innervation and Tumour Growth," and begins thus: "In searching the vast literature on tumours, only occasional and fleeting references concern nerves in relation to tumour growth. Even in the larger, comprehensive works this matter is dismissed with a few words. Accordingly, the nervous system appears as of little, if any, account in the development and life of tumours." It is quite evident these views are

in need of drastic revision. In the same connection, I may point out, that in 1924 in the *British Medical Journal*, I wrote that cancer probably owed its initiation to loss of normal trophic nerve influence caused by an irritant, and not to the action of the irritant on the cells themselves, as many generations of cells die off and are replaced by fresh cells before a local irritant causes cancer as a rule. Shortly after my article appeared in 1924, there was a meeting at the Medical Institute, Liverpool, to discuss Dr. Young's microbial theory of cancer. At this meeting (reported in *B.M.J.*), Prof. Paul of Liverpool, expressed the opinion, in view of his extremely wide surgical experience, that the nervous system was an important factor in cancer formation. My book on cancer goes in minute detail into the initiation and mode of growth of all tumours, including cancers, and shows exactly the rôle of the nervous system in their formation and growth.

It is very interesting, as it adds further concrete proof to my thesis on cancer, to see, according to Prof. Oertel's article, that, "Prof. Beattie, formerly of University College, London, now of the Anatomical Department of McGill, who kindly looked over some of these slides, tells me that these finer fibrils remind him of the embryonic nerve branches in the development of the stomach. I leave for the present undecided whether this has any particular significance in regard to growth of immature tumours."

Dr. Oertel will see from my book that this embryonic appearance of the nerve fibrils is, in fact, of the very greatest significance.

Referring again to Prof. Beattie, Prof. Oertel proceeds, "He has also drawn my attention to an article by C. J. Hill (*Phil. Trans. Roy. Soc.*, London, Series B., 1927, ccxv, 335-387), which shows in some illustrations (notably 27 and 28) of terminal epithelial nerve ramifications between and around cells in a villus of small intestine of a new-born rabbit a resemblance to some of our own tumour preparation."

This also is further confirmatory proof of my thesis that preliminary to tumour growth there is always precedent degradation of the nerve fibrils supplying the involved tissue cells—the injury to the nerves being caused by local anaphylactic reaction over a period of time.

Dr. Oertel in the concluding remarks of his article says, "Indeed, the conception of 'independence' and 'autonomy' in tumour cells, if these observations are further substantiated, will have to be modified or interpreted accordingly."

As regards this, I contend that the primary cellular conception of cancers and other tumours, which for so many years has un-

fortunately been held inviolable, which has for so long held back the advance of knowledge in these matters and has thus been the cause of a vast amount of unnecessary misery and suffering in vertebrates generally, was finally and irrefutably destroyed when my book was published in 1927.

Yours faithfully,

42 Bentley Rd.,
Liverpool, May 21, 1928.

ANDREW S. MCNEIL

To the Editor:

I have read the letter of Dr. Andrew S. McNeil of Liverpool, which you were good enough to send me.

Anyone acquainted with the questions involved will at once see that his reasoning and assertions are confused, and not at all to the point. In a small book (which I enclose) under the title "The Cancer Mystery Solved" he has advanced no new facts or even scientifically founded theories, but has rather naively conceived and phrased his assumptions as regards the causes and origin of cancer and other tumours. In regard to the rôle of nerves, more particularly, he has simply repeated, in somewhat modified form, an old idea in "loss of trophic nerve control to the parts affected," and he makes much of what he calls "nerve degradation" in its effect on tumour growth. This factor he includes amongst other postulates (six altogether), which I shall quote to you, in order that you may understand his mentality (page 38). "(1) General tissue poisoning (re-arranging of molecular elements); (2) Local tissue reaction (caused by local irritant); (3) Local anaphylactic reaction (plus a weak general anaphylaxis); (4) Altered trophic nerve control to the part affected; (5) Loss of trophic nerve control to the part affected ("Cancer"); (6) General tissue reaction. (In successfully resisted tumour growth, the successive weak general anaphylactic reactions—just as in asthma of childhood—overcome the general tissue-poisoning or 'sensitization,' and so stop the anaphylactic reactions, local and general. If the tumour is not of the very primitive type, the general body tissues, by general tissue reaction, can now treat the tumour as an ordinary inflammatory swelling, and absorb it)."

Further on, he makes these statements (p. 45): "(As tumours are poorly supplied with blood-vessels, except in certain cases where tumours originate in vascular tissues, it is very likely that all the nerves to the part—including the vaso-motor nerves—suffer damage by the local anaphylactic reaction, but this aspect we shall not further consider.)"

"The cells are not yet completely out of control of the damaged trophic nerves, but are in a state of unstable equilibrium. As the trophic nerve fibres become more primitive in type, through losing their covering, owing to the continued anaphylactic reactions caused by the continuing intermittent local irritation, so do their 'orders' to the cells supplied by them become more primitive. The cells themselves become more primitive, divide more rapidly, and finally, when the uncovered trophic fibrils succumb to the continued local anaphylactic reactions, the pressure of the growing tumour cells, and the juices elaborated by them, the tumour cells are quite out of control; the tumour has become completely 'autonomous' and is now classed as a 'cancer'." (!)

I need not make any comment on these statements. But in any event, the rôle which the author assigns to the loss of nervous control in regard to tumour growth is not a new one, for this is a hypothesis which has been advanced, in different modifications, by various authors since the celebrated experiment made under Schröder van der Kolk, laid down in an inaugural dissertation in 1834, to whom Virehow refers in his work on tumours in 1863, page 61. Amongst later authors, Rindfleisch and Borst have also emphasized the possible relation of lack of proper nerve regulation (a local tissue weakness) as regards tumour development; and the commonly accepted idea of the absence of nerves in tumours has been put forward as a support of these hypotheses.

With all such hypothetical ideas our work has nothing to do! It does not deal with any theory of tumour formation, but it records a definite morphological finding of newly formed nerves in tumours. (Consult in this connection the Editorial in *The Lancet*, March 24, 1928. The importance of such a finding in relation to the present ideas of cancers is there properly stated). Indeed, we are still engaged in further confirming and extending these findings, and it may be added that the very demonstration of newly formed tumour nerves removes much support of ideas which bring "lack of tissue organization" or a "local nerve weakness" or "loss of control," or "nerve degradation" (whatever these indefinite phrases may mean), into direct connection with tumour growth.

While Dr. McNeil advances a general hypothetical conception of the origin of cancer, I cannot find that he has in any way carried on investigations on the actual demonstration of tumour nerves, or even furthered our knowledge of tumours. Even less can I see how he can find, as he states, anything in our researches to confirm his views in his thesis that "preliminary to tumour growth

there is always precedent degradation of the nerve fibrils supplying the involved tissue cells—the injury to the nerves being caused by local anaphylactic reaction over a period of time.” (Page 5 of Dr. McNeil’s letter to you).

The question which concerned us is not, I repeat, one of theory, but of fact—namely, *do tumours actually possess nerves of their own?*

Much more could be said in serious criticism of Dr. McNeil’s own writing, and his rejection of the important contributions from others as regards experimental tumour growth, but I think I would only try your patience, and enough has been said to show his inability to grasp the issues about which he quarrels. I have not answered his letter, nor have I taken notice of his book, for the simple reason that I did not consider an answer of any useful purpose. His letter to you only confirms my opinions.

Sincerely yours,

HORST OERTEL,

*Strathcona Professor of Pathology,
McGill University, Montreal*

June 11, 1928.

THE PROVINCIAL MEDICAL BOARD OF NOVA SCOTIA

To the Editor:

On page 761 of the issue of the *Canadian Medical Association Journal*, June number, appears this item:

“During the last session of the Provincial Legislature, an Act was passed amending the Medical Act. Previously the Board was constituted of nine members appointed during pleasure by the Government, and six members elected by the Medical Society of Nova Scotia for periods of three years. As amended, the Government appointees will hold office for three years, but will be eligible for re-appointment, and the Government may remove any members of the Board upon due cause being shown. In April, Drs. M. A. MacAulay, E. V. Hogan, Halifax; J. A. Sponagle, Middleton; M. Sullivan, Glace Bay; J. W. McLean, North Sydney; E. E. Bissett, Windsor; F. C. Lavers, New Ross; J. C. Morrison, New Waterford; were removed from membership on the Board by Order-in-Council, and the following were appointed to the vacancies thus created: Drs. O. B. Keddy, Windsor; Hon. W. N. Rehfuess, Bridgewater; W. N. Cochran, Mahone; F. R. Little and John

Rankine, Halifax; B. E. Goodwin, Amherst; Allister Calder, Glace Bay; Hon. B. A. LeBlanc, Arichat.

W. H. HATTIE”

One rather significant and peculiar detail, for some reason, seems to have been missed by your correspondent, *viz.*, that Dr. J. J. Cameron of Antigonish, one of the older members of the Board appears to have escaped the general slaughter, and still remains a Member of Provincial Medical Board of Nova Scotia, while others, who were appointed at the same time and since, were summarily dismissed, no reason or explanation being vouchsafed. Dr. Cameron had long passed the three year period, and the Government, to be consistent, should have cancelled his old commission, as was done in the case of the other eight, and then re-appointed him, if they so desired.

It may be of interest to the profession generally to know just how this thing was done. On or about April 20th of this year notices were sent out to the various members of the Board by the Acting Secretary, to attend a meeting, on May 11th. Three days after notices of dismissal were received by eight members of the Board.

No one, so far as I know, was advised of any change in the Act, nor given an opportunity to tender his resignation. Ordinary courtesy, and the usual amenities of life, one would think, would have suggested to the Government that, with this proposed re-organization (if it ever really materializes), a letter of explanation would have been in order. Evidently, the representatives of our profession on the Provincial Medical Board were regarded, in much the same light as highway employees, registrars of births and deaths, etc., and were entitled to no more courtesy or consideration. The Nova Scotia Government, in their methods of dealing with this matter, have established a record discreditable to themselves and not approved of by right-thinking members of our profession, irrespective of their political affiliations.

Your truly,

J. A. SPONAGLE.

Middleton, N.S., June 15, 1928.

N.B.—It will be noticed that the Government appointed two of themselves.

“Too early specialization is one of the great faults of modern American education. The medical school is not the place for the training of specialists. . . . The specialist who has not had a good basic medical training is a danger to society.”—Dr. W. S. Thayer, President, American Medical Association.

Rochet and Peycelon record the rare event of an aneurysm of the splenic artery, of syphilitic origin, which caused death by rupture into the stomach. The aneurysm was so deeply situated as to be undetectable by palpation.—*Lyon Médical*, 1927, vol. xxxiii.

Topics of Current Interest

STUDIES IN THE RELATION OF HEREDITY TO CANCER*

BY MAUD SLYE

Chicago

Experiments in the nature and behaviour of cancer have been carried on in the cancer laboratory at the University of Chicago during the past eighteen years. All studies have been with spontaneous cancers arising in the natural life of the animals exactly as man's spontaneous cancers arise. The autopsies have now numbered over 65,000, including between 5,000 and 6,000 primary spontaneous cancers. These tumours have included practically every type and location of tumour known in human pathology.

These studies have demonstrated that hereditary predisposition bears a definite relation both to the tendency to be exempt from cancer and the tendency to be susceptible to it. In thousands of mice bred in the laboratory, the tendency to be exempt from cancer was transmitted as a simple dominant trait along mendelian lines.

Results of Cross Breeding.—When a cancer-free mouse was mated with a cancerous mouse, none of the first generation offspring had cancer. The tendency to be exempt from cancer thus behaved like a simple mendelian dominant. If, however, two of these first generation hybrids were mated, one-fourth of their off-spring were susceptible to cancer, while three-fourths were exempt from it. Thus the tendency to be susceptible to cancer behaved like a simple mendelian recessive.

If instead of mating two first generation hybrids, each first generation hybrid was mated with a cancer-free mouse, no cancer appeared in the second generation. In this manner, that is by mating all first generation hybrids with cancer-free mice, all cancer susceptibility has been ruled out of the entire family for many generations. Thus the tendency to exemption from cancer is unquestionably inheritable. Many hundreds of strains and branch strains have been carried in this laboratory, which have never shown a tumour growth of any kind, either malignant or benign. This means that in many families, carried for fifty or more generations and comprising thousands of members, there has been complete exemption

from cancer. Those cancer-free mice, when bred into other families, carry with them exemption from cancer as a dominant character. Compare this with the record of man who pays no attention to heredity in his matings, and where one in eight over a certain age is dying of cancer, and note how tremendously hopeful is this fact of the inheritability of the tendency to be exempt from cancer.

The tendency to be susceptible to cancer is also inheritable, but it is inheritable as a recessive character. This means, that even though there is a great deal of cancer on one side of the family, even to 100 per cent, if there is no cancer in the other side of the family, all the children will be cancer free. If they in their turn mate with cancer resistant individuals, cancer should be eliminated from their immediate families also.

There are apparently two factors necessary for the production of cancer; first, the inherited susceptibility (that is susceptible soil), and second, irritation or chronic stimulation of the type fitted to induce it. In mice susceptible to only one location of cancer, no amount of irritation or stimulation applied to other parts of the body has ever to date produced a cancer. Avoidance of irritation to the locally susceptible tissues has prevented cancer even in susceptible individuals.

Susceptibility to cancer has proved to be local and not systemic. This means that if an individual susceptible to cancer will protect himself against irritation of locally susceptible tissues, he may avoid cancer even though he is susceptible. If every individual knew his heredity, as the heredity of those mice is known, and knew to what type and location of tumour he was susceptible, he might avoid the type of irritation fitted to induce the disease, and thus avoid it, even though he were a member of a 100 per cent cancer family.

The fact of the inheritability of resistance to cancer is one of the few hopeful observations ever made concerning this disease, because it means that, instead of every one being susceptible, large numbers are exempt. This is certainly a most encouraging fact, and it should be allowed to lift the fear of possible cancer from those who are by heredity exempt from it. It also means that it should be possible wholly to eliminate cancer by the appropriate genetic procedure. This does not mean that we can yet relax our vigilance against all forms of chronic irritations in any case; since we have not as yet even begun to apply the facts of heredity to the human species. But it

* Abstract of an address given by Maud Slye, Associate Professor of Pathology, University of Chicago, at the Third Race Betterment Conference, Battle Creek, Michigan, January 2-6, 1928.

does mean that we should begin to take steps to make such an application, and that in this procedure lies much hope.

Moreover, since there is in man the beginning of a genetic sense, (that is a sense for the fitness of matings) it should be possible to educate this sense. *This is the great hope for humanity.* The way to educate it, is to make generally known the facts and operation of heredity, so that man need not be blind as to what characteristics he is transmitting to his children. Thus, it should become possible wholly to eliminate such diseases as cancer.

If, therefore, we would uniformly permit examination after death, as is the invariable rule in this laboratory, the exact facts concerning disease in man could be obtained. If these facts were then kept in permanent record, as every fact is kept in permanent record in the laboratory, in two generations, by the right matings, just as I have eliminated the disease from hundreds of families in the laboratory, so it may be possible to eliminate cancer from human families.

THE VALUE OF A CREDIT BALANCE IN YOUR VITAL ASSETS ACCOUNT

People have no doubt been very much comforted in the past ten years by frequently hearing the statement made that in the last fifty years, fifteen years have been added to the life of man.

This statement is unfortunately somewhat misleading, inasmuch as it can be demonstrated that this saving occurs for the most part during the first twenty years of our lives, and in fact the greatest saving is during the first year.

Obviously then, what is meant by this statement is not that fifteen years have been added to all of our lives, but that the expectancy of human life has been increased, as the result of the activities in the field of preventive medicine, during the first two decades of life.

The so-called wasting diseases of middle-life—that is, cancer, chronic heart disease, chronic Bright's disease, premature hardening of the arteries, apoplexy—have not been influenced by the activities in public health and preventive medicine. This is largely due to the fact that these diseases come on so insidiously that their presence is not suspected until they are far advanced, oft times approaching a fatal termination, unless they are revealed as the result of examinations for life insurance, or, as during the Great War, by medical examining boards.

However, within the past few years there has been a rude awakening. We know now that many cases of heart disease, kidney disease, premature hardening of the arteries

and apoplexy can be traced back to early infections following an acute communicable disease, and later on to syphilis or focal infection from the tonsils, teeth, accessory sinuses in the head, chronic diseases of the appendix, prostate, gall bladder or from the large intestine.

These degenerative diseases of middle life are responsible for over 40 per cent of our total death rate every year, and have not only been uncontrolled but are increasing year by year.—*Health Bulletin*, Toronto, May 5, 1928.

LABORATORY METHODS IN DIAGNOSIS

Although the very proper effort to establish more and more firmly the scientific basis on which the art of medicine rests must inevitably tend to emphasize the academic aspect of medicine, it would be disastrous if this were to bring about any slackening of endeavours along the line of clinical observation. In an address on diagnosis (*Brit. M. J.*, 1928, i, 335), Dr. Robert Hutchison suggests that as a result of the increased facilities for laboratory and other investigation, which are to some extent intended to apply the findings of academic medicine to practical uses, there is to-day some deterioration in bedside observation as compared with former days. If this indeed be so, it behoves us to be careful, for modern educational demands require an increasing amount of time to be spent in the laboratory, and presumably (unless familiarity is to breed contempt) an increasing attention to laboratory methods.

The question therefore arises, Is there really any reason why laboratory methods, even if multiplied far beyond those in use to-day, should divert attention from the clinical study of disease? The answer is certainly in the negative, if only the nature of the information these laboratory methods afford is clearly recognized. On this point, however, there appears to be a good deal of misapprehension, and even Dr. Hutchison seems perilously near error when he speaks of "laboratory tests and other short cuts to diagnosis" (italics ours), though his whole argument makes it abundantly clear that for him, at least, there can be no such short cuts. Laboratory workers, like other specialists, are apt to be over-enthusiastic about their own branch of work, and to attach undue weight to the information they are able to give; but no laboratory method yet devised can provide a short cut anywhere; on the contrary, it can only put another fact at the clinician's disposal, and so increase the number of data, whose value it is his business to assess in coming to a considered opinion. But laboratory methods do provide facts; and it is here that the clinician is sometimes at fault, for if the laboratory finding is not in harmony with his clinical conception of

the case he is apt, especially in his teaching, to draw distinctions between "clinical observation" and "laboratory methods" which are by no means flattering to the latter. This is all wrong; there is no real distinction between the two types of observation.

The fact that a patient has an eosinophilia, a raised blood urea, or a positive Wassermann reaction, is merely a clinical observation which it happens to be more convenient to make in the laboratory; but if we were to take the necessary apparatus to the bedside, such investigations would in no essential way differ from those made, say, with a stethoscope or a thermometer, and the information they give is much of the same order. Viewed in this light laboratory methods merely give additional clinical facts. Occasionally it may be a fact which dominates all others, but far more often it is one which, fitting into its place with others in the mosaic, helps to complete the diagnostic picture. Sometimes, indeed, the fact is one for which no place can be found, but this should not be made a ground of complaint against laboratory methods; it is merely evidence of our present ignorance. In the early days of the Widal reaction it was

sometimes a complaint that the reaction was negative in a clinically clear case of typhoid fever, but the subsequent recognition of the paratyphoid organisms proved the accuracy of the laboratory work; and doubtless much that seems contradictory to-day will be made plain by the knowledge of the future.

It is, however, not to be denied that danger lurks in too great emphasis upon the importance of the laboratory, and it would be an interesting experiment if, during some part of their career, students could be prevented from access to all reports from special departments, and were made to rely entirely on their own investigations. For some minds there is a curious attraction about facts elicited from a test tube or by the microscope, as being more scientific than those observed by the unaided senses, and this is a prolific source of error. The sensible plan seems to be to collect all the facts that are within our reach by whatever means they are obtained, and then, taking Dr. Hutchison's wise words to heart, pray that we may be granted the supreme diagnostic gift—a right judgment in all things.—*Brit. M. J.*, 1928, i, 361. (Editorial).

Abstracts from Current Literature

MEDICINE

The Value of the Electrocardiogram in Acute Rheumatic Fever. Reid, W. D., and Kenway, F. L., *New Eng. J. Med.*, Mar. 15, 1928, cxcviii, 4.

As is the case with other chronic progressive diseases, it is highly important to detect the earliest signs of involvement of the heart in acute rheumatic fever. Increased attention is being paid to the condition of the myocardium from the earliest stage of this disease, and the electrocardiograph is being employed to help in the detection of derangements of the heart muscle.

A series of 26 cases of rheumatic fever in the Boston City Hospital have been studied from this point of view, three types of changes being especially looked for, namely: (1) increase in the auriculo-ventricular conduction time; (2) alteration in the ventricular complex; (3) various irregularities in rhythm. Repeated electrocardiograms on the same patient were taken in order to detect the changes, since these are often transient.

The findings of these authors indicate that the heart muscle is affected in a large proportion of cases. There was an increase of

auriculo-ventricular conduction time in 92 per cent, in 42 per cent of which it took the form of partial heart block. Change in the ventricular complex was detected in 80 per cent, and extra-systoles in 34 per cent. These findings correspond with the reports of other observers.

It is important to note that evidence of myocardial development is found even when the arthritis has completely disappeared and the heart appears normal on physical examination, not only that, but the electrocardiogram may be the first and only evidence of cardiac involvement. There seemed to be no relation between the duration of the joint symptoms and the degree or persistence of the electrocardiographic changes.

This high incidence of changes in the electrocardiographic examinations confirms the opinion which is now widely held that the heart is involved in all cases of rheumatic fever, even if there are no clinical signs of the involvement. It also is in accord with the conception that whilst the arthritic changes are exudative and may be checked with salicylate medication, those in the heart are proliferative and may progress in spite of what appears to be improvement clinically.

H. E. MACDERMOT

Some Points in the Early Diagnosis of Diseases of the Central Nervous System in General Practice. Adams, D. K., *Glasg. Med. J.*, May, 1928, cix.

Many practitioners of wide experience might be inclined to say that organic nervous disease is hopeless, a point of view which depends mainly on the fact that exact diagnosis is so difficult in this type of disease. In no other branch of medicine do so many similar pictures of disease arise from different causes, or a single etiological factor give rise to such dissimilar clinical conditions. A broad survey shows, however, that most organic nervous diseases fall into one or other of three main groups, neuro-syphilis, disseminated sclerosis, and epidemic encephalitis. Cerebral tumours are comparatively much fewer than any of these, but still form a fourth important group.

The most important point in dealing with these is their early detection, and yet Dr. Adams holds that rarely if ever are they diagnosed in their earliest stages. In the case of neuro-syphilis text-book descriptions rarely conform to what is seen in practice, and certainly not to what is taking place in the very early stages. If the diagnosis depends only on finding Argyll-Robertson pupils, abolished knee-jerks, and Kernig's sign, it is not to be expected that treatment can be of much avail, in spite of therapeutic agents of such power and specificity as salvarsan.

Among early symptoms transient diplopia is of first importance. Dr. Adams in a large series of cases has only twice found this to be without an organic basis, and in both these cases there was a high degree of astigmatism. Inequality of pupils, irregularity in outline, impairment of consensual reflex to light, slowing and fatigue of the light reflex, are all changes that may precede a fully developed Argyll-Robertson pupil. Ptosis or gradual development of a squint are highly suggestive.

Derangement of bladder function is another early symptom. It may take the form of frequency, precipitancy, hesitancy, or retention. Crises also are frequently early in appearing. Reference is made to the frequent mistaking of these for acute abdominal conditions. Such patients often present no other signs of tabes. Other forms of crisis, such as the laryngeal, must also be borne in mind. Dr. Adams cites the case of a young man in whom a tracheotomy was performed for symptoms of urgent asphyxia, which were later shown to be a laryngeal manifestation of neuro-syphilis. In this case the pupils were normal and the knee-jerks brisk, but close questioning brought out a history of previous double vision, frequency and precipitancy of micturition, and girdle pains.

Disseminated sclerosis is the next commonest organic nervous disease in Europe. With all its many resemblances to neuro-syphilis it almost certainly has no etiological relationship with it, although there is evidence to suggest that it is due to a non-syphilitic spirochæte. In this disease also it is quite evident that when the clinical signs have become as definite as given in the text-book, paraplegia, intention tremor, nystagmus and slurring speech, the damage to the brain and cord must be extensive and irreparable. Of the early symptoms transient diplopia, especially in a young healthy adult, is of very grave significance. Temporary loss of sight is another important sign. It is due to a retro-bulbar neuritis and may improve in a few weeks, hence the likelihood of its being passed over as "idiopathic."

One of the most constant early signs is loss of abdominal reflexes. Derangement of bladder function is as common as in neuro-syphilis and as in that disease is an important early symptom.

The treatment need not be regarded with the hopelessness which it commonly arouses, if the disease be recognized early. Even after allowing for the spontaneous remissions which characterize its course, much may be done with artificially produced pyrexia, mercury and salvarsan.

As regards epidemic encephalitis Dr. Adams has a less optimistic view. It is noteworthy that with each epidemic recurrence it has shown fresh manifestations which tends to make the diagnosis extremely difficult at times. It may be confused in its severe forms, with tuberculous meningitis, or cerebral tumour. The Wassermann reaction should serve to separate it from cerebral syphilis. Only too often it is only by the subsequent development of Parkinsonism that encephalitis is finally recognized. So far no really hopeful treatment has been evolved. The suggestion that a dietetic factor is partly responsible is worthy of investigation.

The conclusion is that in nervous diseases early recognition is essential for successful treatment, and such recognition can be achieved only in general practice. It is with the general practitioner that the hope of real advance lies, as it does in most fields of general medicine.

H. E. MACDERMOT

An aid to the Early Diagnosis of Measles and Possibly Various Other Eruptive Diseases. Wadsworth, W. M., and Misenheimer, E. A., *J. Am. M. Ass.*, May 5, 1928, xc, 18.

The authors noticed, while using ultraviolet radiation for a child who had just recovered from measles, with disappearance of the eruption five days before, that exposure to ultraviolet rays in a darkened room made visible what seemed to be a generalized eruption on

the trunk, face and limbs. They then made observations on the effect of exposure to these rays in cases of measles in the pre-eruptive stage, and in the first case observed they found that the eruption showed beneath the epidermis exactly 48 hours before it became visible microscopically. A total of 14 cases were observed under these conditions, and it was found that the rash appeared at times varying from 33 to 76 hours after it became visible under the ultraviolet rays. The 76-hour case was a child of two years whose condition was followed from the beginning of the fever. It was found that the rash is present somewhat earlier in blondes than in brunettes; also that it becomes visible sooner in babies than in older children. The average seemed to be about fifty hours.

This method was tried in one case of scarlet fever and the rash showed plainly 11 hours before becoming visible to the naked eye.

The authors feel that this way of determining the presence of a rash before it becomes apparent should be of considerable value in settling the diagnosis in the earliest possible stages. They refer to two cases in which the patients had been exposed to measles and had high fever, but in whom the ultraviolet ray failed to show any rash; thereby reversing an original diagnosis of measles.

They suggest that this may be a useful aid in determining the time at which it is safe to discharge a case of measles, as the rash is plainly visible on exposure to the rays for a number of days after its apparent disappearance. Eruptions in other diseases also, such as variola, syphilis, typhoid fever, would probably be detected and confirmed by this means.

H. E. MACDERMOT

A Case of Erythroedema or "Pink Disease." Currie, D. L., *Brit. M. J.*, 1928, i, 48.

This disease is sometimes called erythroedema polyneuritis, and seems to be quite rare. The author's case was in a boy aged two years and eight months. The disease began with malaise and occasional vomiting about two weeks before the more serious manifestations. Then the child developed intestinal colic, with slight elevation of the temperature. The bowels were constipated. Three days later photophobia and conjunctival injection were noted, and the child was completely hypotonic. The tips of his fingers and toes were now slightly reddened, swollen, and painful to the touch. The next day he became semi-comatose, and his fingers, toes, and the greater part of his hands and feet were bright red, swollen, and acutely tender. Wasting was rapid. Three days later, improvement was noted; his temperature began to fall; the red oedema was less marked. Then, the affected skin began to peel, complete casts of some of his fingers being shed in one piece. As he convalesced he was

noted to be quite weak; his legs were wasted and flabby, and the knee-jerks were absent. It is suggested that "pink oedema" is a polyneuritis due to an intestinal toxæmia.

A. G. NICHOLLS

Fatal Poisoning by Borax. Birch, John, *Brit. M. J.*, 1928, i, 177.

The case recorded by Mr. Birch has so many points of similarity with that described by Mr. Donald Currie under the name "erythroedema" or "pink disease," noticed above, that it raises the important point whether poisoning by borax or boracic acid may not account for the latter rare affection.

A child, two weeks old, was found to be unconscious, extremely emaciated, and with the eyelids closed. All four extremities were markedly flexed at all joints. The respirations were irregular; the heart-beats were normal. The temperature was subnormal. The fingernails and terminal phalanges of the left hand were coloured a bright red, as if painted; the forefinger was red and swollen as far as the wrist, in marked contrast to the fingers of the right hand. The coloured fingers were tender. A red ring surrounded the anus; the entire scrotum and the lips had the same abnormal colouring. A spot of red was visible at the external extremity of the right upper eyelid. The feet were normal. The bowel washings had the "cooked spinach" appearance described as occurring in Mr. Currie's case.

During the previous five or six days the infant had consumed about one and a half drachms of borax and boracic acid, in the form of honey and borax and glycerin of borax, administered to prevent thrush on the advice of a nurse. The child died three days later, when seventeen days old. There was post-mortem staining of the same colour. The muscles and arterial blood were pink. Not much else was found. The stomach contained about one ounce of a thin, yellow, opaque substance resembling honey. The liver and kidneys were dark, the latter being congested with spots of hæmorrhage under the capsule.

The author suggests that many cases of obscure illness in infants may be due to the administration of borax. A dummy teat, dipped in glycerine of borax may carry 1½ to 2 grains of borax, all of which is swallowed.

A. G. NICHOLLS

Thoughts on the Morbid Processes Active in Pernicious Anæmia. Krumbhaar, E. B., *Am. J. Med. Sc.*, April, 1928.

The disease is more than a matter of cell destruction, the increase in hyperplastic hæmopoietic tissue is much greater than the increase in blood destruction. It would seem that a more fundamental defect of the hæmolytotoxic system may be the inability to form

efficient erythrocytes. Why are these cells unfit? It seems that some substance in the liver interrupts the pernicious process in the bone marrow and allows it to settle down to a normal activity.

There is a question as to whether the active liver substance is a vitamine, hormone detoxicant, or still some other kind of agent, or whether it merely replaces something absent or deficient in the pernicious anæmia liver. Whipple has advocated the view that pernicious anæmia is a deficiency disease, due to a deficiency in materials that build the stroma of the erythrocyte. That the spleen is also concerned is indicated by the prompt improvement that usually follows splenectomy. In addition to the hæmolytic function it may have an influence in preventing the liver from exerting a maturing effect on the erythroblasts.

Achlorhydria is probably a constant but preceding and otherwise unrelated accompaniment of the disease. The chief types of causative agents that have been advanced are: some unknown intestinal ptomain, a chronic cholecystitis, a hypersplenism, a disturbance of lipid metabolism with an accumulation of hæmolytic unsaturated fatty acid. It is safe to say that none has ever approached proof, just as one can say that the real disease has never been produced experimentally.

From the evidence at hand and *a priori* reasoning, one leans toward an intestinal noxa, somehow associated with achlorhydria and absorbed by the portal system. This hypothetical noxa may in turn in its passage through the spleen stimulate it to excessive hæmolysis, as well as damage its normal relation to the hæmopoietic function of the bone marrow. Arriving in the liver, it may upset that organ's hypothetical relation to hæmopoiesis (perhaps hindering it in furnishing a necessary ingredient) with the result that inefficient erythrocytes are prematurely ejected into the blood stream or their maturation delayed and disturbed, so that in spite of the marrow hyperplasia an insufficient number of inefficient erythrocytes are turned out, to be destroyed in excessive numbers, as is well recognized in the pathological anatomy and physiology of the disease.

LILLIAN A. CHASE

The Ten Year Diabetic. What He Is. What He Should Be. How to Make Him So. Joslin, E. P., *Am. J. Med. Sc.*

At present the ten-year diabetic is one whose disease began when he was between 15 and 68. Most frequently his disease has begun in the fifth decade. Frequency: 22 per cent of the total cases have lived 10 years. There is good reason to predict that every diabetic will be a ten year diabetic soon. We have had insulin only five years.

Tenth diabetic anniversaries. The celebration of the tenth diabetic anniversary is cheering to the patient as well as to the doctor. It promotes morale. Last year the mortality of the 1,205 cases seen and traced was 3.5 per cent, but for the 235 children it was 1.3 per cent.

Causes of death. Approximately half the deaths in last year's series of 42 deaths were from cardiovascular and renal conditions. Save for cancer 0.47 per cent, the other causes of death were scattering and had little connection with diabetes. Only one case in 42 died of tuberculosis. Arteriosclerosis has replaced coma as a cause of death. Studied by Roentgen ray it is found in every necropsy upon a diabetic, young or old, of five years' duration.

The average age of diabetics at death. The average age of diabetics at death has increased from 44 $\frac{4}{5}$ years in the Naunyn period to 60 $\frac{9}{10}$ years in the last twelve months.

Diabetes is milder the longer it lasts. Formerly diabetics were expected to get worse; now they get better. As the duration of diabetes lengthens, its symptoms should lessen and fade away.

What he should be: If over thirty-five he should be of normal weight and the finest product of the periodic health examination. How to make him so: By the early diagnosis of diabetes. To discover diabetes early seek for it in the obese between 45 and 55.

The prevention of arteriosclerosis. Never overfeed a diabetic, least of all with fat. Protein should be moderate, more than 1 gm. per kgm. of body weight in the young and less than 1 gm. in the old. Hyperglycæmia does not seem to be a cause of arteriosclerosis. Until it is proved that cholesterol in the blood of diabetics is low, it is wise to give few rather than many eggs. Apart from eggs, the quantity of cholesterol in food is comparatively low. Cholesterol is essential and is to be found in practically every cell of the body. Do we manufacture it or eat it only ready made? Can we destroy it or merely excrete it and can we hasten its excretion when it is present in excess? All these questions should be investigated soon.

LILLIAN A. CHASE

Diphtheria Prophylaxis Among Asthmatic Patients. Waldbott, G. L., *J. Am. M. Ass.*, Jan. 28, 1928, xc, 4.

The potential dangers attending the injections of horse serum in the case of asthmatic patients are too well known to call for any restatement. It might therefore be expected that the employment of diphtheria toxin-antitoxin amongst those with asthmatic histories would be frequently attended with dangerous consequences, but in practice this seldom appears to be the case. A great many asthmatics have been given toxin-antitoxin injections without

showing any untoward symptoms, even when they show specific reactions to horse serum.

There is therefore a considerable discrepancy between the theoretical aspect of the causation of asthma and actual experience in the use of these injections containing protein, but, whatever the explanation may be, it cannot be said that no danger exists. Cases, few though they may be, have been reported in which alarming and even fatal results have followed the injection of toxin-antitoxin in the presence of a sensitivity to horse serum; and now Dr. Wald-bott draws attention to a series of cases of severe asthma, whose symptoms were definitely brought on again, and in a much aggravated form, by the injection of toxin-antitoxin serum for the prophylaxis of diphtheria.

He makes two suggestions as to avoiding this danger. One is that in this type of patient the serum should be detoxicated as in Ramon's anatoxin, or Larsen's ricinoleate preparation, thus obviating the use of horse serum. But even in these preparations there are proteins of various kinds, and they may be capable of precipitating asthmatic attacks in those who are susceptible. It is therefore suggested in addition that small desensitizing doses of serum should be given to these patients before the whole injection is given, and this is probably the safest course to pursue in every case.

H. E. MACDERMOT

Le Groupe Sanguin II de l'Homme Chez le Chimpanzé. Human Blood (Group II) and the Chimpanzee. *Ann. de l'institut Pasteur*, 1928, xlii, 363.

This author, in a most interesting and suggestive article, has investigated the blood group reactions in man and the chimpanzee. He begins with a short resumé of the work done on precipitins, agglutinins and hæmolysins in the past; comments on the confusion in the literature in regard to the nomenclature of the various blood groups, to remedy which he suggests that an international conference should take up the matter. He then defines his own nomenclature, and gives a valuable statement in regard to the percentages of the different blood groups in many races of mankind. He points out that the laws of Mendel apply to the different blood groups, and, following von Dungern and Hirschfeld, Ottenberg, Dycke and Plüss, considers the cellular agglutininogen to be the dominant character.

The following are the author's findings:—

1. The red corpuscles of the chimpanzee (14 animals tested) are agglutinated by human sera III (B) and IV (O); human sera (AB) I and II (A) are without action on these corpuscles.

2. The serum of the chimpanzee agglutinates human red cells I (AB) and III (B). It has no action on human cells II (A) and IV (O).

3. The blood of chimpanzees, then, presents the blood characters (agglutininogen A and agglutinin B) of group II in man.

4. Man, of group II, can receive with impunity intravenously the citrated blood of the chimpanzee.

5. This identity of cells and sera in the case of the chimpanzee and man of group II tends to support the hypothesis of the common ancestry of chimpanzee and man.

A. G. NICHOLLS

Neue Versuche über Immunisierung mit Ab-getöteter Pockenvakzine. (A New Method of Immunization with Devitalized Small-pox Vaccine). Knopfmacher, W., and Stohr, D., *Monatschr. f. Kinderh.*, 1928, xxxvii, 4.

These observers have found that by repeated injections of small amounts of cow-pox vaccine, heated to 56° C., so as to devitalize and attenuate it, it is possible in many cases to produce immunity against cow-pox. In young infants three injections of one gram of such an avirulent vaccine produce a certain protection against subsequent skin inoculations with the regulation vaccine.

The glycerinated lymph is diluted with physiological salt solution in the proportion of 1-2 or 1-5, and injected, preferably at intervals of five days. This method is recommended in the case of children exposed to the danger of contracting small-pox, who are not, for any reason, suitable subjects for the ordinary small-pox vaccination.

A. G. NICHOLLS

SURGERY

The Present-Day Status of Operative Treatment of Ulcer of the Stomach and Duodenum. Haberer, H., *Deutsche Zeitschrift für Chirurgie*, 1927, cc, 212.

Surgeons to-day are by no means agreed upon the proper operative treatment of gastric and duodenal ulcer. Broadly speaking, there are two schools of thought upon this subject, one conservative, the other radical. Followers of the conservative school recommend palliative operations and short-circuitings. Supporters of the radical line of thought insist upon complete removal of the primary lesion together with a considerable portion of the stomach itself, and re-establishment of gastro-intestinal continuity by one of several methods.

From a study of 2,100 cases operated upon by himself Prof. Haberer places himself unreservedly in the group of "radical" surgeons: He has performed resection 1,698 times for ulcer of the stomach or duodenum. He summarizes his views and reviews the advances of the past decade as follows:

There are to-day no generally-accepted rules for the selection of the most suitable operative

procedures in the surgical treatment of ulcer, but guiding principles can be laid down along general lines. At the present time radical surgery seems to offer more promise of a successful result than conservative methods. Resection, however, cannot be designated as the operation of choice in the hands of all surgeons, on account of the difficulties of the procedure. The less experienced and less skilful workers will show better results with gastro-enterostomy than if resection be attempted, especially when the local conditions present great difficulties. Even the most radical exponents of resection cannot dispense with gastro-enterostomy as the proper procedure in inoperable ulcer, whether the inoperability depends upon the extent of the disease or the condition of the patient.

Of the indirect or palliative methods, gastro-enterostomy always gives the least number of post-operative jejunal ulcers. Pyloric occlusion in any form is to be abandoned, as it accomplishes no more than simple gastro-enterostomy, and has a much higher percentage of subsequent jejunal ulcers. Further studies are required to determine whether simple jejuno-stomy shall be given a definite place as a method of ulcer treatment. There are two weak points in all palliative operations. First, they do not with certainty lead to the healing of the ulcer, and thus do not protect the patient from the complications of ulcer (bleeding, perforation, cancer). Second, it is not always possible at operation to distinguish between cancer and ulcer. Mistakes are possible in at least 5 per cent of cases.

Of the radical methods the sleeve resection has been discarded by many surgeons on account of the few satisfactory permanent results obtained and the danger of the recurrence of the ulcer. It cannot be employed as the method of choice in ulcer of the stomach. Billroth's resections with removal of the pylorus give good results *if the whole acid-liberating mechanism is removed*. Radical resection can thus be avoided. In resection the most important fact to keep in mind is the frequency of multiple ulcers. Many so-called recurrent ulcers following resection will not stand critical examination, but must be considered as true ulcers overlooked by the operator through ignorance or incomplete technique. It cannot be denied, however, that true recurrences can take place.

A definite number of jejunal ulcers have occurred following Billroth II. Their number can be reduced by faultless technique, but cannot be entirely abolished, because the method does not re-establish the normal physiological relations of the parts. Pyloric glands scattered in the first part of the duodenum may explain some of the jejunal ulcers after Billroth II. The resection according to Billroth I has the

advantage over Billroth II that it retains the normal physiological relations. Apparently it is not followed by jejunal ulcer. It is, however, much harder to carry out than Billroth II, and the number of cases in which it can be used is much smaller. Of late the method has been extended by the introduction of termino-lateral anastomosis between the cut end of the stomach and the mobilized descending portion of the duodenum. (Haberer's operation).

The only proper treatment of jejunal ulcer is its radical resection. Billroth I has here the same advantages as Billroth II. In carcinomatous degeneration the operation must naturally be carried out as early as possible.

Chronic recurring bleeding from ulcer demands operation before anæmia brings an irreparable damage to parenchymatous organs. Acute hæmorrhage demands immediate operation, if a previous diagnosis of ulcer has been made, and its situation is known. There may be multiple ulcers, and bleeding may recur after one lesion has been dealt with at operation. In acute hæmorrhage in a patient in whom an accurate diagnosis has not been made operation may fail to reveal an ulcer, and the patient will only be harmed by the procedure. In such cases conservative treatment is indicated. Blood transfusion is of greatest service. Operation is demanded in acute perforation. The general condition of the patient and the ability of the surgeon will decide whether conservative or radical treatment shall be carried out. In properly selected cases resection in the hands of experienced rapid operators gives the best results. Primary closure of the abdomen is desirable. In gradual perforation expectant treatment is indicated. When the symptoms have subsided one can operate with greater safety than in the early period, when abscesses are often encountered, and radical operation prevented.

R. R. FITZGERALD

Surgery of the Large Intestine. Pool, E. H., and McGowan, F. J., *Am. J. Surg.*, March, 1928, iv, 245.

Most of the lesions of the large intestine, not including the rectum, are situated in the cæcum and must be considered as possibilities in the study of the average chronic case. The authors discuss in this paper tuberculosis, actinomycosis, carcinoma, intussusception, mesenteric obstruction, Hirschsprung's disease, diverticulitis, colitis, amœbic dysentery and polyposis.

Tuberculosis.—Localized tuberculosis of the colon is more frequent than is usually supposed, often goes unrecognized, and has as its most frequent sites the cæcum and ascending colon. The most significant type is the hyperplastic, resulting in marked thickening of the wall and relatively little ulceration. The

symptoms suggest chronic intestinal obstruction, slowly developing constipation, with periods of diarrhoea. On examination with a barium enema the characteristic filling defect of hypertrophic tuberculosis is a complete absence of barium at the site of the lesion, differing in that respect from carcinoma. Other lesions than carcinoma are difficult to differentiate, even at operation, such as inflammatory conditions about the appendix, or actinomycosis.

When stenosis has developed operative relief is indicated and when the lesion cannot be differentiated from carcinoma the treatment should be the same as for cancer. In general, however, the treatment should be conservative, for intestinal tuberculosis can heal completely when treated by heliotherapy, which must be continued intensively under expert direction for many months.

Actinomycosis.—This fungus selects the ileo-caecal region as the usual site and results in a slow chronic inflammatory reaction, causing marked thickening of the intestinal wall, later involving adjacent structures, including the abdominal wall and retroperitoneal tissues. When the sinuses develop through the abdominal wall the fungus may be recognized in the scant pus. In the early stages the lesion may be mistaken for carcinoma, hyperplastic tuberculosis, or chronic inflammation dependent on the appendix, and the true nature cannot be recognized at operation. Therefore, resection is the appropriate procedure; but later, when fistulae and infiltration have occurred, radical operation is useless.

Carcinoma.—The colon is a frequent and relatively favourable site of cancer; favourable, because it is limited in extent, slow in growth and late in metastasizing, the secondaries for a long time being confined to the regional lymph-nodes. Various histological types of cancer occur, and the advantage of slow growth is often sacrificed by late recognition. Frequently, the palpation of a mass, or the onset of intestinal obstruction, are the first symptoms. Suggestive symptoms are blood in the stools, abdominal discomfort, and bowel derangement. Any or all of these symptoms should lead to a persistent investigation to seek their cause. Pain or discomfort of a colicky nature may be the first complaint. The sigmoid is the most frequent site, then the caecum, then the ascending colon. If involving the right half of the colon, diarrhoea usually occurs for a time, whereas constipation is usually associated with involvement of the left colon.

The authors emphasize two general details of diagnosis: first, the importance of a routine rectal and sigmoidoscopic examination; second, the danger of administering barium by the

mouth in cases of suspected obstruction, thereby converting a chronic into an acute obstruction.

With regard to treatment: before obstruction resection is the rule. In the right half of the colon this should be in one stage, but in the left half a two-stage operation is infinitely safer. In acute obstruction palliative procedures should always be elected, *i.e.*, drainage above the obstruction. The diseased bowel is not favourable for an anastomosis and the toxæmia of obstruction renders the patient intolerant of prolonged operation.

Important features in the surgery of carcinoma of the colon are early operation, early recognition of obstruction, and relief of retention.

Intussusception.—This should be diagnosed if a child, between six and twelve months old, has sudden, severe, colicky and intermittent abdominal pain with vomiting. The vomiting occurs early. Blood and mucus are passed *per rectum* after the bowel contents have been evacuated. Abdominal palpation shows a sausage-shaped tumour, not always in the right ileac fossa, which may be palpable *per rectum*. Early operation is essential.

Mesenteric Obstruction.—Mesenteric obstruction is due either to embolus or thrombosis of a mesenteric vein. Diarrhoea with blood in the stools and indefinite abdominal symptoms often precede the more serious symptoms of obstruction. If operation is performed early, results are usually satisfactory; later, the condition is usually fatal.

Hirschsprung's Disease.—Two-thirds of the cases involve all of the colon; in the others the dilatation is confined to the pelvic colon. The symptoms are marked constipation from infancy and abdominal distension, with a characteristic picture given by the x-ray. Treatment is irrigation of the bowel followed, if not satisfactory, by cæcostomy or resection.

Diverticulitis.—The sigmoid is by far the most frequent site and, as a rule, the diverticula do not give rise to symptoms until the onset of an inflammatory reaction. This inflammatory reaction simulates that of inflammation of the appendix and, on account of the slowness of the inflammatory progress, abscess with walling-off is the rule. Chronic symptoms occasionally occur, giving rise to repeated attacks of discomfort in the lower left quadrant, with frequent and inadequate stools. Diagnosis is confirmed by the x-ray examination.

The significant features of diverticulitis are that it is a disease of adult life, with left sided symptoms similar to acute or subacute appendicitis, and the inflammatory process goes on to abscess-formation. The treatment, when the symptoms are acute, is operation; when abscess is formed, drainage being instituted and nothing else.

Colitis.—Colitis presents the symptoms of pain, diarrhoea with blood in the stools, tenderness along the site of the colon and sometimes fever. The course is protracted, and in severe cases anaemia is marked, resulting in the patient becoming extremely weak and prostrated. Amœbic and tuberculous ulcerations must be excluded in the diagnosis. Treatment on the basis of recent studies includes, besides local measures, correction of distant foci of infection and the use of vaccines. If surgery is resorted to a cœcostomy is indicated.

Amœbic Dysentery.—This disease may involve the whole large intestine, but the cœcum is the favourite site. The ulcers are characteristic, with a small opening on the mucous membrane leading to a cavity in the sub-mucous coat, hence the term "flask-shaped." The symptoms resemble those of colitis, but the diagnosis in this condition depends entirely on the finding of amœbæ in the stools. The results with emetin are excellent.

Polyposis.—The structure of polypoid tumours is that of an adenomatous hyperplasia of the intestinal mucous membrane, resulting in hæmorrhage, and diarrhoea, with a marked tendency to malignant change. Palliative treatment is unreliable; resection is rarely successful, on account of the extensive and low distribution of the lesions.

R. V. B. SHIER

The Precancerous Changes in the Rectum and Colon. Lockhart-Mummery, J. P., and Dukes, C., *Surg., Gynec. & Obst.*, May, 1928.

One of the greatest difficulties in studying the etiology of cancer is that the disease is seldom seen in the early stages of development. Thus the changes in the normal epithelium which result in malignant tissue are still but little understood.

In the vast majority of cases of rectal cancer there is nothing in the patient's history which points to any previous condition acting as a forerunner. There does not appear to be any relationship between hæmorrhoids, internal or external, and carcinoma. Pruritus does not act as a forerunner, as it does in the epithelioma of the vulva, but chronic fistula does occasionally appear to act as an exciting cause. Chronic constipation appears to be without importance, and it must be admitted that, apart from adenoma, we know of no condition in the rectum which predisposes to cancer with any frequency.

It is evident that the etiology of malignancy cannot be elucidated by the histological study of tumours, and that one must go farther back and examine changes in the epithelial cells before malignancy is reached. This is a difficult procedure, because it is hard to obtain suitable material, but, just as Sir Lenthal Cheatle has recorded the relationship of chronic hyperplastic

changes and malignancy in the breast, the authors are able to provide pathological and clinical evidence of similar changes which precede cancer of the rectum.

Multiple adenoma presents the best clinical example of the simple adenoma which undergoes malignant change and develops into typical carcinoma. The histological examination of large simple adenomata not infrequently reveals commencing malignancy.

If the portion of bowel removed at operation for excision of cancer is immediately examined after fixation, with a low power microscope, there will often be seen irregularities in the contour of the mucosa, not visible to the naked eye. These irregularities occur in multiple adenomatosis and early carcinoma and are seen to be due to a localized epithelial hyperplasia, which may be invisible to the naked eye and only detected by microscopic examination, or, on the other hand, may be large enough to be noticed as tiny, smooth, rounded elevations. These areas of hyperplasia represent the first stage of tumour formation, and in this connection there are three points of importance: (1) their frequent association with multiple adenomatosis and carcinoma; (2) their more frequent presence in the neighbourhood of a small malignant tumour than a large malignant ulcer; and, (3) that they affect an area of bowel, several inches above and below the carcinoma. No sharp line of distinction can be drawn between this hyperplasia and adenoma. In practice the authors reserve the term adenoma for a glandular tumour visible to the naked eye, and class as hyperplasia those areas only visible on magnification.

The sequence of events in the development of cancer may be divided into four stages: (1) localized patches of hyperplasia; (2) the appearance of a crop of sessile adenomata; (3) carcinomatous development, either in one of these pre-existing adenomata or in the neighbouring epithelium; and (4) the progressive enlargement and dissemination of the malignant tumour.

The precancerous state in the rectum is distinguished by irregular patches of hyperplasia and adenomatosis. Not every area of hyperplasia evolves into an adenoma, or the adenoma into cancer, for the hyperplasia may disappear and the adenoma may become pedunculated and be shed, or the onward march may otherwise be arrested. The authors cite several cases in confirmation of their findings. The truth seems to be that adenomata, once removed, do not occur in the same spot, but other adenomata tend to develop in the neighbouring mucous membrane. These arise as the result of the occurrence of progressive hyperplastic change over a fairly extensive area of the bowel epithelium.

It is very important that repeated sigmoido-

scopic examinations should be made in patients who have had adenomata removed, to determine the presence or absence of a fresh development of tumour.

R. V. B. SHIER

PATHOLOGY

Syphilitic Lesions as met with at Post-Mortem Examinations. Cleland, J. B., *Med. J. Australia*, 1928, xiii, 399.

This paper gives the frequency of various syphilitic lesions as discovered in 1,600 autopsies conducted at the Adelaide Hospital from the beginning of 1920 to the end of 1927, and in 145 autopsies at the Mental Hospital.

It was found that rather more than 4 per cent of the bodies of patients examined at the Adelaide Hospital showed syphilitic lesions. At the Mental Hospital less than 10 per cent manifested syphilitic infection.

Among the cases at the Adelaide Hospital syphilitic aortitis was by far the commonest lesion. In about half of the cases in which this occurred an aneurysm had resulted. In a considerable number of the remainder the disease affected also the aortic valve. In four cases it was thought that fibrosis in the lungs might have been contributed to by a syphilitic infection. There were three possible gummata of the lung, and one possible syphilitic pneumonia.

A. G. NICHOLLS

Obituaries

Dr. Hamilton Allen, a graduate of McGill University (Med. '72) died in March at San Diego, Cal., where he had resided for some years. He was a native of the vicinity of Kemptonville, Ont., and attended the high school of that place before proceeding to McGill. Burial was made at Tacoma, Wash.

Dr. James Borison McLean, who died in Toronto on April 1st at the age of 57 years, was one of the best known medical practitioners in Northern Ontario and practised for many years in Sault Ste. Marie, where he was resident physician of the Algoma Steel Corporation. He was born in Arnprior, Ont., a son of the late Rev. James McLean, and after having attended the public and high schools in that town, proceeded to Queen's University, Kingston, where he completed the course in Arts. After graduation from McGill in Medicine, he spent a year as house surgeon on the staffs of the Royal Victoria and Western Hospitals in Montreal and, in 1900, established himself in practice in Sault Ste. Marie. Late in 1915, Dr. McLean enlisted in the C.A.M.C. and became attached to the 119th Overseas Battalion as medical officer. When that unit was broken up, he went to France as a member of the staff of No. 2 Canadian Stationary Hospital and other institutions, and after the armistice was attached to the Ontario Military Hospital at Orpington. In 1919 he returned to Sault Ste. Marie and resumed practice. Dr. McLean was stricken with a hemorrhage of the brain while at work in the Plummer Memorial Hospital at Sault Ste. Marie and died a week later. In 1922 he was married to Miss May McCauley, of Sault Ste. Marie, and, in addition to his wife, is survived by three daughters and one son.

Dr. James Reynolds, a graduate of Dalhousie in 1900, died June 7, 1928, at his home in Upper Stewiacke. He was of a very retiring disposition, a lover of nature, of fishing and hunting, and, having retired from active practice some fifteen years ago, he was not well known by the profession generally. He was, however, a man of very fine intellect and well posted in his work. But once in these later years did he emerge from his retirement, and that was on the occasion of the Halifax explosion when he gave valuable surgical services for forty-eight continuous hours.

Dr. H. A. Bonner. A remarkable old character died in the person of Dr. Hector A. Bonner in Toronto on June 8th. Born in King, 1850, seventy-eight years ago, Dr. Bonner graduated at old Trinity in 1877, and practised in the village of Chesley up to 1896. At this time the wandering spirit seems to have broken loose, and he departed to the Yukon, 1897, as surgeon to the Royal Northwest Mounted Police. While in the Yukon it seems he was able to take up land grants which eventually became valuable, and which he sold on his retirement from the police. He retired to Toronto in 1900, and after twenty years away from the profession, resumed work in 1920, and was in practise up to the time of his death.

Dr. D. A. Clark, Assistant Deputy Minister of Health, died in Ottawa on June 13th. A graduate of Victoria in 1890, and of Toronto in 1891, Dr. Clark had practised in Uxbridge and later in Toronto, where he was known as a practitioner of unusual merit. With the outbreak of the World's War he at once went into the medical corps of the Canadian army and rendered noteworthy service, both as an active front line worker and as an organizer.

Wounded at the second battle of Ypres, he was returned to Canada, in 1917; appointed Assistant Deputy Minister of Health in the federal services in 1919, he had been actively at his work up to a few months ago, when failing health compelled a retirement. As major in the C.A.M.C. Dr. Clark was well known throughout the expeditionary force as a courageous and efficient officer. While at Ottawa he was recognized as an official of a most exemplary type.

Dr. Sophia G. Laws. The death occurred in Pasadena on May 25, 1928, of Dr. Sophia G. Laws of Windsor, N.S. She received her M.D. from the Women's Medical College of Philadelphia in 1903. She registered in Nova Scotia in 1917. Having been on the staff of the Nova Scotia Sanatorium for several years she began to practise in her native town. Being compelled to seek a change of climate she established a small sanatorium and has been in active work for some five years in Pasadena.

Philip Doane McLaren, M.D. C.M., one of the best known and most promising of the younger men in the medical profession in Nova Scotia passed away

May 25, 1928, at the early age of thirty-two years. He died at the Victoria General Hospital, Halifax, of pneumonia after but one week's illness.

Dr. Philip McLarren was born in Halifax in 1896, the son of Prince Doane McLarren, for many years superintendent for Nova Scotia of the Canada Life Assurance Company. Even in his early college days he showed that unmistakable talent which presages success, and when he graduated from Dalhousie University in 1917 he had the distinction of being characterized by medical men of the city as one of the most brilliant students who ever passed through that institution of learning. During the final year of his studies he was attached to the Staff of the Victoria General Hospital as an interne.

Immediately following his graduation Dr. McLarren joined the Canadian Expeditionary Force, and served his country until the conclusion of hostilities. He took a keen interest in the work of the Royal Air Force and, attached to this service, was at one time stationed at Croydon airdrome in England. On his return to Canada he became attached to the Air Board as medical examiner of pilots and personnel, and he was also medical examiner for the Halifax Aero Club. An active member of this latter organization, he took a great interest in its work, and gave generously of his time in furthering its development.

At an early stage in his professional career he identified himself with the Halifax Medical Society, as well as the Medical Society of Nova Scotia and the Canadian Medical Association, having made his membership in all three effective for this current year. Dr. McLarren held a teaching position in Dalhousie University and was on the staff of the University Clinic. Just eight months ago he was appointed assistant physician to the Victoria General Hospital.

In the city press, the day following his death, Dr. E. V. Hogan, President of the Victoria General Hospital Medical Board, expressed the following tribute to his memory.

"In the sudden death of Dr. McLarren Halifax has lost one of the most promising junior members of the medical profession, and his colleagues, who knew him so well, are stunned with the announcement. He has been cut off in the flower of his youth, when a long and useful life was just beginning to dawn, when the citizens of Halifax, those who knew him, were learning to love and appreciate his learning, his skill, but above all his cheery presence at the sick bedside and his kindly word to brighten the sick one's burden. And it is the poor—God's suffering poor—who will miss him most of all. He fought the fight by day, and by night, and like the gallant soldier that he proved himself in the past war, he fought on and on;

and some may say that he lost the fight and went down to defeat, but we who knew him and loved him will say, "No"—for he won a victory, a victory that was crowned by a glorious death, a martyr to the high ideals of a profession, whose motto is "I Serve."

Dr. McLarren's death will be a hard blow to the medical staff of the Victoria General Hospital, for we, the older members of the staff, were looking forward to the day of our retirement; and it was with every confidence that we were preparing to lay down our burden and thrust it on the willing shoulders of our younger confrères, knowing that men of the type of McLarren would carry on and put no blot on the reputation of those who in their turn laid down the burden of alleviating the suffering of the sick poor, and went to their long and last reward.

To the widow and fatherless child our staff offers its deepest sympathy in their irreparable loss, but in the days to come may their grief be somewhat assuaged by the knowledge that his memory will be ever dear to the medical staff of our hospital."

S. L. WALKER

Dr. E. Rochette, sole surviving male member of his line in Canada, and one of the oldest physicians in the Province of Quebec, died in Oka on June 18th, after an illness of only a few hours, in his 79th year. The family of the Counts de la Rochette de Rochegonde settled in Canada more than a century ago. Dr. Rochette was the last male of the branch here. The head of the family is Count Henri de la Rochette, of Auvergne, France. Other living members of the line are Countess des Bois Hebert-Gaste de Tilly, Miss Letitia Rochette, niece; Mrs. G. W. Jolicoeur, wife of the Coroner of Quebec, and a grand-daughter, Mrs. Henri de B. Taschereau, of Montreal.

Dr. Rochette graduated from Laval in 1872.

Dr. T. H. Taylor. One of the best known medical practitioners in Montreal West passed away recently, in the person of Dr. T. H. Taylor, formerly superintendent of the Western Hospital. Dr. Taylor's death occurred at the Western Hospital, after a short illness, in his forty-sixth year. A native of Cumberland Mills, Que., he was educated at the Quebec High School and McGill University. After graduating from the latter institution he joined the Western Hospital staff as an interne, later becoming superintendent. For the past fifteen years Dr. Taylor had practised in Montreal West, residing at 73 Westminster Avenue. He was an Anglican and a member of the Masonic Order. He is survived by his widow and four children.

News Items

BRITISH EMPIRE

The first annual meeting of the College of Surgeons of Australasia took place at Canberra on March 31, 1928. The formation of the College has met with much opposition as may be gathered from editorial comment in the *Medical Journal of Australia*. (April 21, 1928).

"There has been a considerable amount of criticism concerning the methods that have been adopted by the founders of the College of Surgeons. This criticism began as a whisper and culminated in a shout. No one appears to challenge the objects of the institution. It seems that exception is taken by some to the endeavour

to apply a hall mark to certain practitioners whose training and experience give them a right to stand in the front rank of surgeons. It is held that if this hall mark is so distinct that the community at large cannot fail to distinguish it, the reputations and earning capacity of less well trained and less experienced practitioners must suffer. This argument is specious, for it is essentially in the interests of the community that save in emergency surgical intervention should take place under the most favourable conditions. The life and the safety of a patient should not be endangered because a medical practitioner has to make a living.

There are many general practitioners who have trained themselves to become skilful and competent as operating surgeons; the reputation of these men is well known to the community in which they live. Their colleagues soon realize their claims and admit their ability. But there are others who pose as surgeons without such justification.

The fact that the College of Surgeons is a self appointed body is an empty proposition. The British Medical Association was founded by a single individual. The Royal College of Surgeons began as a guild of self-elected craftsmen and afterwards obtained official recognition and statutory sanction. Again offence has been taken on account of the methods of selection of the Fellows. Mistakes may have been made, but those

who have examined the procedure dispassionately and disinterestedly, will admit that honest caution has been exercised in the selection. Lastly, it has been claimed that the whole of the medical profession or at least the whole of the Branches of the British Medical Association in Australasia should have been consulted in regard to the machinery of the College. Had this been done, the College would have been useless and its essential object would have been defeated. The College of Surgeons of Australasia is a fact, in spite of the opposition. If it exercises wisdom in the manner in which it conducts its business and carries out its functions, it will have a great future. A few minor mistakes and errors of judgment are of small moment. The thing that matters, is that it is fearless in the prosecution of its ideals."

GREAT BRITAIN

William Harvey

The Tercentenary Celebration

"The international celebration in London of the tercentenary of the publication of William Harvey's 'De Motu Cordis' opened on Monday. In the morning the delegates, who had come from all parts of the world at the invitation of the Royal College of Physicians of London, were received by the King at Buckingham Palace, and later in the day they formally presented addresses to the President of the College and listened to eulogies of the man who is regarded as the founder of modern medicine.

Sir John Rose Bradford, President of the College, presented to the King one hundred delegates representing twenty-eight countries. In the course of an address he said that Harvey's demonstration that the same blood must flow unceasingly round and round the body, visiting its remotest parts, swept away the visionary speculations of his predecessors and paved the way for a scientific explanation of the purpose of the circulation of the blood. Thus it was that the publication of the 'De Motu Cordis' had been rightly acclaimed as the birthday of physiology and of scientific medicine. His Majesty, in identifying himself with the commemoration of Harvey's work, was but treading in the footsteps of his Royal ancestors. King James I. and King Charles I. both set a true value on Harvey and made him their own physician, and the latter supplied him with the bodies of deer from the Royal herds for his anatomical studies. Harvey constantly brought to King Charles natural curiosities for his inspection, and exhibited to him much of his experimental work. Together also they shared the rare experience of watching the beating heart in a human subject through a defect in the chest-wall produced by disease. In the Civil War, too, Harvey stood by his Royal master, and was present at Edgehill, in charge of the young Princes Charles and James, and afterwards at Oxford, where by Royal mandate Harvey was appointed Warden of Merton College.

The King, in reply, said in part:—

'I thank you sincerely for your address. It is a great pleasure to me to join with my people in welcoming the many distinguished men from my Overseas Dominions, and indeed from all parts of the civilized world, now assembled in London in honour of the tercentenary of Harvey's immortal discovery.

'I appreciate the comparison drawn in your address between my part in to-day's ceremony and the action of my predecessors, who befriended Harvey in his lifetime. I am proud to think that the Kings of England of that day, recognizing Harvey's great gifts, granted their patronage and help in his work, and are thus entitled to the credit of having contributed to the new birth of medical science.

'The importance and value of William Harvey's work cannot be exaggerated. In an age when physiological knowledge was in a state of darkness and chaos, he laid the essential foundation for a science of physiology by demonstrating not only the fact of the circulation of the blood but the manner in which it took place. He discerned and taught that the true method of scientific progress is by observation and experiment; and it is for this, and not merely as the author of a single discovery, however brilliant and fundamental, that we to-day do honour to the name of Harvey.

'Science, as you truly say, knows no boundary of race or nation. Harvey's own career is an instance of this. He was a graduate not only of our own Cambridge but also of Padua, which ancient and illustrious University I am happy to see represented here to-day. And we may proudly note that Harvey, in his three-fold capacity as a successful physician in private practice, as physician to St. Bartholomew's Hospital, and as an eminent student and investigator, foreshadowed what is now, and has long been, characteristic of British physiology—the combination of research with medical and surgical practice, allied with a generous devotion to the service of the poor in the public hospitals'."—*The Weekly Times*, May 17, 1928.

A reception was held in the library of the Royal College of Physicians on May 14th, when the President, Sir John Rose Bradford, received the delegates and distinguished guests in connection with the Harvey Tercentenary. The occasion was made more noteworthy by the conferring of Honorary Fellowship of the College on the Earl of Balfour, Sir Ernest Rutherford, Professor Pavlov, and Professor Wenckebach.

Harvey's connection with St. Bartholomew's Hospital was commemorated by a luncheon in the Great Hall on May 15th at which Sir Wilmot Herringham delivered an address on Harvey's work and life.

The celebrations concluded with a banquet given by the Royal College of Physicians at the Guildhall on May 16th, at which a very brilliant galaxy of guests was present.

Other features were the visit of some of the delegates to Harvey's old College of Merton, Oxford, and of others to Gonville and Caius College, Cambridge, where Harvey took his B.A. degree.

The Winnipeg Annual Meeting in 1930

During the past three weeks the Officers and officials of the British Medical Association have been in consultation, in regard to the details of the Winnipeg Annual Meeting, with two delegates specially sent by the Canadian Medical Association for this purpose. These delegates were Dr. T. C. Routley, General Secretary of

the Canadian Medical Association, and Dr. J. D. Adamson of Winnipeg, a prominent officer of the Manitoba Medical Association. The arrangements provisionally decided upon will be submitted to the Council at its June meeting, but members will be interested to know that the delegates showed that much thought had been already given to the arrangements in Canada; that every facility for interest and enjoyment will be given, not only at Winnipeg, but in every part of Canada which members can find time to visit; and that the Canadian Medical Association in general, and its members in Manitoba in particular, would cordially welcome a large attendance. The representatives of the British Medical Association had the pleasure of entertaining Dr. and Mrs. Routley and Dr. and Mrs. Adamson to lunch at the May Fair Hotel on April 25th. Dr. and Mrs. Routley left for Canada at the end of the week, but Dr. Adamson is staying for several months to do some post-graduate study, and will be a delegate of the

Canadian Medical Association at the Annual Meeting of the British Medical Association at Cardiff.—*Brit. M. J.*, May 5, 1928.

A life of exceptional promise has been cut short by the death at Accra, West Africa, of Dr. William Alexander Young, director of the Medical Research Institution of the Gold Coast. Young was closely identified with the yellow fever investigation of the Rockefeller Commission in West Africa, and appears to have succumbed himself to yellow fever while carrying on work on that disease. His death follows, within eight days, that of his colleague, Hideyo Noguchi. Another colleague, Dr. Adrian Stokes, died last year from yellow fever. These three men have fallen in the active service of humanity.

Young was born in 1889 and was educated at Forfar Academy and University College, Dundee, (St. Andrew's University).

GENERAL

The Twelfth Session of the Health Committee of the League of Nations

The twelfth session of the League Health Committee, held at Geneva from April 30th to May 5th inclusive, was attended by most of the overseas members of the Committee.

The members at present are:

President: Dr. Th. Madsen, Director of the State Serum Institute, Copenhagen.

Presidents: (ex officio) M. O. Velghe, Secretary-General of the Ministry of the Interior and of Health, Brussels, Président of the Comité permanent de l'Office international d'Hygiène publique; Dr. G. Arazo Alfaro, President of the National Health Department, Buenos Ayres; and Dr. H. Carrière, Director of the Swiss Federal Public Health Service, Berne.

Members: Professor Léon Bernard, Professor of Tuberculosis at the Faculty of Medicine in Paris, Technical Health Adviser at the Ministry of Health; Sir George Buchanan, Senior Medical Officer, Ministry of Health, London; Professor J. Cantacuzène, Professor of Bacteriology and Director of the Institute of Experimental Medicine, Bucharest; Dr. Carlos Chagas, Director of the Oswaldo Cruz Institute, Rio de Janeiro; Dr. Witold Chodzko, former Polish Minister of Health, Director of the State School of Hygiene, Warsaw; Surgeon-General H. S. Cumming, Chief of the United States Public Health Service, Washington; Dr. J. H. L. Cumpston, Director-General of the Commonwealth Department of Health, Melbourne, Australia; Colonel J. D. Graham, Public Health Commissioner with the Government of India; Dr. C. Hamel, President of the Reichsgesundheitsamt, Berlin; Dr. Alice Hamilton, Harvard University; Dr. N. M. J. Jitta, President of the Public Health Council of the Netherlands; Professor Ricardo Jorge, Director-General of Public Health, Lisbon; Dr. A. Luttrario, former Director-General of Public Health, Ministry of the Interior, Rome; Dr. Nagayo, Head of the Institute of Infectious Diseases, Tokyo; Professor B. Nocht, Rector of the University and Director of the Institute of Tropical Diseases, Hamburg; Professor Donato Ottolenghi, Professor of Hygiene at the Royal University of Bologna; Professor Gustavo Pittaluga, Professor of Parasitology in the Faculty of Medicine at Madrid; Dr. L. Raynaud, Inspector-General of the Public Health Service of Algeria; Dr. M. Tsurumi, Representative of the Public Health Service of Japan; Dr. C. E. A. Winslow, Professor of Hygiene at the Yale Faculty of Medicine.

A few of the salient features of the report of this meeting are here presented.

In the matter of broadcasting information in regard to health conditions in the East, the Epidemiological Intelligence Bureau is now in weekly communication with 140 ports, and in this way all may be accurately posted as to the prevalence and distribution of infectious diseases. Reports have been received from this bureau indicating that yellow fever has reappeared in West Africa.

A program in regard to the interchange of medical health officers and sanitary engineers between different countries, for the purpose of discussing problems of civic and rural hygiene, was drawn up for 1928.

The Committee approved the report and recommendations of the Cancer Commission, including the formation of the expert sub-commissions for the study respectively of occupational cancer and certain aspects of the radiological treatment of cancer. It is known that certain callings (some methods of cotton-spinning, the process of briquette-making, work in cobalt mines, one branch of aniline dye-work, and work involving contact with tar) increase susceptibility to cancer, but there is a very irregular distribution of cancer in different countries even in the same industries. Valuable lessons on the causation of cancer could be learned from the intensive study of the causes of this unequal distribution. The application of preventive methods also needs enquiry.

The great value of the radiological treatment of cancer has been demonstrated by experience, but there is a lack of agreement as to the precise action of the rays and the best methods of applying them. A study of the basic principles of the methods followed in a number of the most successful institutes in different countries would be of great practical value.

The Committee approved the suggestion of the Smallpox and Vaccination Commission that the enquiry into the incidence of smallpox in Europe should be continued and extended to North America and the Dutch East Indies. At the present moment there is very little smallpox in Europe, which makes it possible to study closely such cases as appear, in order to determine, for instance, the exact rôle played by vaccination in reducing sickness and deaths, and to study the value of measures to prevent any future increase of the disease. There is a good deal of mild smallpox in Great Britain and Wales, but the continent is almost free of the disease. The Commission is also studying a number of points concerning the preparation, use, and effect of different vaccines.

The Committee took note of a memorandum submitted by Dr. Jitta on the possible dangers resulting

from the increasingly widespread use of x-rays, and requested the Medical Director to ascertain the existing laws or regulations on this subject in different countries and any other information bearing on action that has been or should be taken to obviate such dangers.

The Health Committee noted that the enquiry into infant mortality in Austria was concluded last December, and that in Great Britain in January, and the enquiries in the other European countries were still under way. The preliminary enquiries in Latin America are concluded, and the enquiry, properly so-called, is being carried out in certain districts in Brazil, Uruguay, the Argentine Republic and Chile for a period of twelve months.

As in previous years special courses on malaria, followed by a stage of practical work in malarial countries, have been arranged, and are this year to be held in London, Hamburg, Paris and Rome. Fourteen scholarships are awarded for these courses by the Health Organization, in addition to those provided by the International Health Division of the Rockefeller Foundation.

The Council of the League of Nations recently adopted a resolution concerning the recommendation of the International Opium Convention, to which Canada is a signatory, to the effect that Eucodal and Dicodeide are narcotics capable of producing harmful results similar to those specified in the Convention, and should subsequently be subject to its provisions. They, therefore, recommended to the states signatory to the International Opium Convention that action be taken in regard thereto. As a result, the Government of the Dominions of Canada has passed an Order-in-Council, which comes into effect on June 12th, adding these to the schedule of the Opium and Narcotic Drug act.

An Order-in-Council has also been passed cancelling the last paragraph of Section 2 of the Regulations issued under the Opium and Narcotic Drug Act reading:

"All licenses issued under this Act are subject to cancellation in the event of a licensee being found guilty of an offence against any of the provisions of the said Act."

substituting the following therefore:

"Licenses issued under this Act are subject to cancellation at the discretion of the Minister."

International Conference on Cancer

An International Conference on Cancer, convened by the British Empire Cancer Campaign, will be held from July 16th to 20th in London, at the house of the Royal Society of Medicine. Physicians, surgeons, pathologists, and radiologists from all parts of the world, whose work has been closely associated with inquiry into the causes and cure of cancer, will attend, and the Royal Society and all the principal universities, medical schools, and

scientific bodies of this country have appointed delegates. Sir John Bland-Sutton, Bt., vice-chairman of the Grand Council of the Campaign, will preside, and Sir Richard Garton, chairman of the Finance Committee, is acting as honorary secretary of the Conference. On Wednesday, July 18th, H.R.H. the Duke of York, President of the Campaign, and the Duchess of York will receive the delegates and their wives at Lancaster House (London Museum), which has been lent by the trustees for this purpose.

A representative delegation of Canadian x-ray men will be present at Stockholm for the Second International Convention on Radiography, including Dr. Bauld, of Montreal; Dr. A. Stanley Kirkland, of St. John; Dr. Hamish MacIntosh, of Vancouver; Dr. Geo. MacNeil, of London; Dr. Geo. Malcolmson, of Edmonton; Dr. Patterson, of Ottawa; Dr. A. H. Pirie, of Montreal; Dr. C. W. Prowd, of Vancouver.

International Medical Post-Graduate Courses in Berlin

These are arranged, with the help of the medical faculty of the University, by the Lecturers' Association for Medical Continuation Courses and the Kaiserin Friedrich-Hause. Part of the courses take place at any time; part, only in October, 1928.

I. PERMANENT COURSES

1. Courses for 2 to 4 weeks.
2. Courses, as guest-assistants in clinics, hospitals, and laboratories, for 2 to 3 months or longer, for gentlemen desiring to do practical work under systematic supervision.

II. COURSES DURING OCTOBER, 1928

1. A general course on "Survey of progress in the whole medical field," with special reference to pulmonary diseases, October 1 to 13, 1928.
 2. A special course for nose, throat, and ear-specialists, October 8 to 20, 1928.
 3. A post-graduate course on pædiatrics, October 15 to 27, 1928.
 4. A post-graduate course on "New methods of diagnosis and therapy," with practical studies and exercises, in the wards and laboratories of the Friedrichshain City Hospital.
 5. Single courses in all special fields of medical science, including practical work.
- The courses are held in German, but numerous professors are able to lecture in the English, French and Spanish languages.
- The Office assists in procuring suitable lodgings, gives information *re* cost of stay, and arranges visits to clinics and operations, etc.
- The office quarters are in the Kaiserin Friedrich-Haus, Luisenplatz 2-4, Berlin, N.W.6.

NOVA SCOTIA

A number of nurses recently graduated from the training school of the New Waterford General Hospital, with appropriate ceremonies.

Miss Strum, Superintendent of Nurses, Victoria General Hospital, Halifax, has been elected president of the Association of Graduate Nurses of Nova Scotia.

The new Hospital for Infectious Diseases, Halifax, is approaching completion, and it is expected that it will be opened towards the end of June.

It is announced that plans are nearly complete for a new hospital, with accommodation for one hundred patients, for the Halifax Infirmary. The Infirmary is conducted by the Sisters of Charity, and has had a highly creditable career in its present building on Barrington Street which goes back over many years. For the new building a much quieter site has been selected, on Queen Street, at the corner of Morris Street. The new hospital is to be of fireproof construction, and will embrace all the latest ideas in the way of convenience and equipment.

A dispute between the Sydney City Council and the City Hospital Board has held up the appropriation of funds for a new x-ray plant for the hospital. It seems that the Hospital Board favour the appointment, as roentgenologist, of a physician who has had much experience at x-ray work. The City Council, on the other hand, wish the position to go to a nurse who has had training in x-ray technique. Neither side seems willing to yield, but the mayor has threatened the Hospital Board that if the appointment made by the Board is not cancelled, the hospital will not get its new x-ray equipment. The hospital is owned by the City of Sydney.

Much regret has been expressed in Halifax at the removal of Staff-Captain Clarke from the Grace Maternity Hospital (conducted by the Salvation Army). Staff-Captain Clarke has been associated with Grace Hospital since its opening, and has shown much tact and wisdom in the direction of the institution during the trying times of the years of establishment. She has won the confidence and esteem of the people of Halifax. Before leaving Halifax, to take charge of the new maternity hospital at Ottawa, Staff-Captain Clarke was made the recipient of a very substantial present from the ladies' auxiliary of Grace Hospital.

In the early morning hours of May 25th, fire was discovered in the Highland View Hospital, Amherst, which had already reached such proportions that, before the fire department could respond to the summons, it had spread practically throughout the building. Heroic work on the part of nurses and other members of the resident staff was rewarded by the safe removal of all the patients. Two of the nurses had a very narrow escape. The hospital was delightfully situated on high ground at a considerable distance from the centre of the town, and unfortunately the firemen found themselves without a supply of water sufficient to cope with the flames. In consequence, within a few hours nothing but the brick exterior walls remained standing. It is understood that the insurance carried was \$100,000.00. Those in residence in the building lost all their effects, and several of the Amherst doctors lost instruments, etc. Dr. A. E. MacKintosh lost his entire operating outfit, including a portable table which he had left in the hospital over night. The directors of the hospital decided at once to take over two large residences for temporary use. The Victoria General Hospital, Halifax, immediately expressed a complete operating-room equipment, and the General Public Hospital, Saint John, offered such assistance as it could give. Within a very short time the hospital was carrying on in its temporary quarters, and one of the first to undergo a surgical operation was a veteran physician of Amherst, Dr. C. W. Bliss.

Mr. Evan Parry, consulting architect to the Federal Department of Health, spent some days in Amherst in conference with the hospital authorities relative to a new building, and Dr. M. T. McEachern announced that the American College of Surgeons would be glad to assist by submitting plans, and otherwise. A new building will be constructed, but the matter of site has not yet been determined.

Dr. J. P. McGrath, Kentville, has returned home after spending eight months in graduate study in the British Isles and on the continent.

Dr. F. R. Little, Halifax, declined to accept nomination for re-election to the presidency of the Halifax County Conservative Association at its recent annual meeting, but was elected honorary president of the organization.

In order to meet a technical requirement of a state board of medical licensure, Dr. S. J. Turel, who gradu-

ated from Dalhousie in 1917, returned to his Alma Mater this year for re-examination in the subjects of the final year in Medicine, and passed with distinction in every subject.

While in Montreal studying recent developments in medicine, Dr. W. T. Purdy, of Amherst, was suddenly stricken with appendicitis. He was obliged to enter hospital at once, and was promptly operated upon. While for some days his condition was critical, it is learned that he is now progressing nicely and will soon be able to return home.

Dr. W. D. Forrest has been re-elected chairman of the City Health Board, Halifax.

The May Examinations of the Provincial Medical Board resulted in the addition of twenty-three names to the Medical Register of Nova Scotia.

At a meeting of the Provincial Medical Board, held on May 11th, only routine business was conducted. Nearly all the newly appointed members were present. Dr. H. K. MacDonald, and Dr. G. H. Murphy, Halifax, and O. B. Keddy, Windsor, were appointed to fill vacancies on the executive committee, caused by the retirement of Drs. MacAulay, Hogan, and Sponagle.

The annual meeting of the Western Counties Branch of the Medical Society of Nova Scotia was held at Yarmouth on May 29th under the presidency of Dr. G. W. T. Farish. After a paper by Dr. A. R. Campbell had been read and discussed, Dr. Elliott P. Joslin, of Boston, delivered an exhaustive and informing address on "The treatment of diabetes." This was followed by an animated discussion in which a large number took part, and which carried on to so late an hour that it was decided to adjourn until June 11th, when routine business and the election of officers will be disposed of and attention given to a communication from the Medical Society of Nova Scotia.

The Halifax Branch of the Medical Society of Nova Scotia is making arrangements for the unveiling of a memorial in honour of the founders of the Medical Faculty of Dalhousie University. The special committee, having the matter in hand, are securing a bronze tablet inscribed as follows:—

In Memory of the Founders of the
Faculty of Medicine of Dalhousie University.

1867.

W. J. Almon, M.D., President.	E. D. Farrell, M.D.
A. P. Reid, M.D., Dean.	A. H. Woodill, M.D.
A. G. Hattie, M.D.	J. D. Ross, M.D.
G. Lawson, Ph.D., LL.D.	T. R. Almon, M.D.

Rev. James Ross, Principal Ex Officio.

"They Builded Better Than They Knew."

Placed by the Halifax Branch of the Medical Society
of Nova Scotia.

1928.

The cost of this tablet is to be met from branch funds. The Committee further suggest the placing on the wall in the medical building of enlarged photographs of early important persons connected with the Medical School. It is intimated that in this item doctors outside the city of Halifax might be interested.

W. H. HATTIE

An exceedingly important meeting of the Executive of the Medical Society of Nova Scotia was held in the Board of Trade Council room, Halifax, June 1st, from 7 to 11 p.m., with representatives present from the Dalhousie Refresher Course Committee, the Halifax Branch Society, and the Committee on the Dalhousie 60th Anniversary celebration.

The first business endorsed the mail ballot of the executive postponing the annual meeting until the fall and combining it with the annual Refresher Course of the Medical College.

The General Secretary for the Society reported that out of a possible membership list of 385 the first drafts had brought 265 fees. It was noted that some 30 more would complete their membership most certainly before the annual meeting. (As a matter of fact, at the present writing the list numbers 275.) The membership aimed at was 300 and there is no doubt but that the Society will "go over the top."

The Secretary was instructed to convey to the Valley Medical Society the appreciation of their courtesy in giving place to the Halifax Society as hosts for the annual meeting. The necessary steps were taken to hold the annual meeting during the week beginning October 15th, in conjunction with the annual Refresher Course of the Medical College and its 60th anniversary. The Society meeting being the 75th annual meeting, plans were approved to have fraternal greetings presented from all the other provincial associations. In this the Canadian Medical Association will co-operate in furnishing speakers.

In case any visitors may think our hotel accommodation is not sufficient, it may be noted that the new Lord Nelson Hotel will be open to the public that week. The Society will therefore share in the opening festivities, the hotel being the official headquarters. All other Provincial Associations will be invited to send representatives to assist in the anniversary proceedings and the Refresher Lectures. A number of matters of general concern were laid on the table till after the Canadian Medical Association meeting in Charlottetown, as they would be dealt with then by the general body.

The announcement of the arrangements for the primary examinations in Canada for the Royal College of Surgeons was noted with approval, and publicity ordered to be given through the *Bulletin*. The establishment of Fellows of the College of Physicians of Canada was regarded as likely to do much to elevate the standing of the profession, and it was resolved that full publicity be given this matter also in the *Bulletin*.

The Executive considered that the proposed legislation introduced into the Canadian Senate, making venereal disease an impediment to marriage, was very desirable but the proposal was too drastic for adoption at the present time. The necessary instructions were issued to ensure the continuation of the publication in the lay press of weekly health articles that have been furnished for the past six months. These articles, as published under the auspices of the Society, were regarded as the best of their kind the press of Nova Scotia has ever had.

Full approval was expressed of the increased size of the *Bulletin*, and its mailing to every practitioner in the Maritime Provinces. It was felt that the amount of extra labour involved was but an expression of hearty sympathy with the Prince Edward Island men in their

undertaking the Canadian meeting, the additional cost to be adjusted with the Canadian Medical Association.

The Executive extended fraternal greetings to the Medical Association of Newfoundland, which meets in annual session the week following the Prince Edward Island meeting.

A special Committee, consisting of the General Secretary, Dr. G. H. Murphy, Dr. Johnston of the Halifax Society, Dr. Curry of the Dalhousie Refresher Course, and Dr. McKenzie for the Dalhousie Anniversary, was appointed to do the necessary preliminary work in connection with arranging for the big medical week in October. It is safe to say this will be the big event in the history of medicine in Nova Scotia.

The annual meeting of the Pictou County Branch of the Medical Society of Nova Scotia was held in Pictou on Wednesday, June 13th, for general business. The scientific part of the program was carried out the latter part of March, when Drs. Adamson and McKay, of Winnipeg, were the chief speakers, each giving two addresses. It may be noted that the first meeting of the Medical Society of Nova Scotia to be held outside of the city of Halifax was also held in the town of Pictou. We are not sure, but it is quite probable that Pictou was selected as being the home town of Dr. John Stewart who had then just recently come to Halifax.

The entire city of Halifax and the many friends of Dr. G. H. Murphy were shocked to learn, the latter part of May, that his son, Arthur, a fourth year medical student at Dalhousie had been the victim of the "Hit and Run" motor-car "skunk" driver. For several days his life hung in the balance. He had a severe scalp wound, three broken ribs, besides numerous bruises, and suffered severely from concussion. It was almost incredible to know that he managed to crawl home unaided almost half a mile. All will hope that the guilty person may be found and receive a lesson that will last him for life and be a warning to other such despicable characters.

The twenty-four graduates of the Medical College this year are all settled for the present. It appears unfortunate that most of them are doing hospital service in the U.S.A., for the majority are then lost to Canada.

Dr. Daniel McIntosh of Pugwash, an octogenarian over fifty years in practice, had his car turn turtle recently, but fortunately he escaped with a bruising and general shaking up. Yet, in a few days, he was back again looking after his practice in the community in which he sought refuge after a thrilling experience in a near-by town some fifty years ago. He is an Honorary Member of the Medical Society of Nova Scotia, and is a regular attendant at medical meetings.

S. L. WALKER

NEW BRUNSWICK

In the Provincial Legislature recently an item for \$100,000.00 was put through the Finance Committee as an appropriation to provide a sprinkler system in the Provincial Hospital for the Insane at Saint John.

The public health legislation at the present session of the legislature in New Brunswick includes a recommendation to reduce the quarantine period for scarlet fever from six to five weeks.

The Board of Commissioners in the Saint John Public Hospital has authorized the purchase of another

radiographic unit in the X-Ray Department, which will provide for two complete units operating in parallel, greatly increasing the efficiency of the department, which is coming more and more to serve the Province of New Brunswick as a whole.

The Federal Department of Indian Affairs has agreed to provide fifteen beds at the Saint John County Hospital for Indian patients, and also to pay the per capita cost for their maintenance. The department has also provided a nurse to look after the tuberculous Indians of Prince Edward Island and New Brunswick.

EPHEDRINE HYDROCHLORIDE "Frosst"

1— *The effects following the administration of Ephedrine are more prolonged than those of Epinephrine.*

2— *Ephedrine, unlike Epinephrine, is absorbed from the alimentary tract without loss of pharmacological activity.*

The field, previously restricted by the fleeting action of Epinephrine and the fact that the drug has always to be injected and therefore requires administration by a physician or nurse, has been very considerably widened by the introduction of Ephedrine. In the short time that it has been used, this drug has proved itself one of our most valuable therapeutic agents.

Ephedrine Hydrochloride "Frosst" is offered in the following forms:—

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For Oral or hypodermic use.

- No. 277—Ephedrine Hydrochloride..... $\frac{1}{4}$ gr.
No. 278—Ephedrine Hydrochloride..... $\frac{3}{8}$ gr.
No. 279—Ephedrine Hydrochloride..... $\frac{1}{2}$ gr.
No. 280—Ephedrine Hydrochloride..... $\frac{3}{4}$ gr.

SOLUTION

Ephedrine Hydrochloride 3% in distilled water. 1 oz. Bottles.

Crystals. $\frac{1}{8}$ oz. and $\frac{1}{4}$ oz. vials. 1 oz. Bottles.

INHALANT—NASAL SPRAY

Ephedrine (Alkaloid) 1% in neutral oil, colored and pleasantly perfumed. 1 oz. Bottles.

— INDICATIONS —

Tablets

IN SURGICAL SHOCK—and in other cases of acute circulatory collapse, where the immediate increase of blood pressure is frequently a life saving measure, Ephedrine in doses of $\frac{1}{2}$ to 2 grains, given by vein, hypodermically, or by mouth, will produce the desired rise in blood pressure, longer sustained than that effected by epinephrine.

IN HAY FEVER and ASTHMA—especially in the allergic and reflex groups, the daily administration, by mouth, of 1 to 5 grains in divided doses has afforded relief in a very large percentage of cases.

IN ASTHMA—due to infection, while the results are not so consistently good, the relief afforded to about 30% of these cases justifies its trial.

IN SPINAL ANÆSTHESIA—the fall in blood pressure may be anticipated and prevented by the administration, by mouth or hypodermically, of 1 to 2 grains of Ephedrine Hydrochloride just previous to induction of anæsthesia.

Solution

LOCAL APPLICATION—of Solution of Ephedrine results in the shrinkage of inflamed and congested mucous membranes. Its action here is more prolonged than that afforded by Epinephrine, and, in addition, the after irritating effects are usually absent.

NOTE—Solutions of Ephedrine Hydrochloride may be sterilized by boiling.

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In Asthma and Hay Fever.

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CANADA

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Hospital Day was the occasion for broadcasting a talk on hospital affairs through Station CFBO, at Saint John, by Mr. Ralph H. Gale, Superintendent of the General Public Hospital. The replies following this broadcasting intimated that it had been well received.

Dr. A. A. Rowan, recently of the Riverglade Sanatorium, has been transferred to the St. Anne de Bellevue, D.S.C.R. Hospital, where he will handle the tuberculosis branch.

Dr. G. G. Melvin and Dr. Wm. Warwick recently spent several weeks as guests of the Rockefeller Foundation, visiting several Public Health Areas in the United States. It is felt that much benefit will accrue from this visit of the senior Health Officers in the Province.

During the last few weeks most of the hospitals in the province have held their graduation exercises and at most of them medical men have been asked to give

the addresses to the graduating class. Dr. H. A. Farris was the speaker at Moncton at the Nurses' Graduation. Dr. Stewart Skinner, of Saint John, was the speaker at the General Public Hospital and his speech was doubly interesting from the fact that for a long time he has been ill, but is now apparently well. His recovery gives great satisfaction to his friends.

Dr. Stanley Bridges is at present in Boston doing intensive study in paediatrics. Dr. Bridges intends to specialize in diseases of children on his return to Saint John.

Dr. Vincent Doucet of Richibucto has been awarded the French Government Scholarship for 1928-29. He will continue his French Course in medicine at Paris.

Dr. A. Stanley Kirkland will sail on June 15th for Europe for a two months' course of study. During this time he will attend the second international convention of radiography at Stockholm. A. STANLEY KIRKLAND

QUEBEC

The Hospice St. Charles, badly damaged by fire on December 14th last, when thirty children lost their lives, will be repaired in the near future.

The St. François d'Assise Hospital is to have an annex built in the near future, a building permit having been issued by the municipal department of the Public Works, at a cost amounting to \$135,000. The contract calls for the completion of the work by September next year. The annex will be used as a residence for the nuns who operate the hospital.

The activities of the Crippled Children's committee of the Rotary Club for the last year were detailed in the annual report. In view of the keenly-felt need in Montreal for accommodation for convalescent crippled children, they felt justified in equipping a ward containing sixteen beds at the Refuge de la Merci, 361 St. Paul Street, to be entirely devoted to this purpose. The budget showed that the entire \$950 appropriated for this cause had been spent, together with an additional \$300, contributed by members for special cases. The report read in part: "Seven hundred and fifty dollars were donated by Miss Tyndale to apply on the cost of food for the operation of the summer camp for crippled children at St. Sulpice, Quebec, which was opened the first week in July, 1927, and operated for a period of eight weeks. The committee is convinced that the summer camp is a wonderful thing for the good of the crippled children on the Island of Montreal, and the committee would strongly recommend that future Rotarian Crippled Children's committees carry on in assisting the operation of the camp. During the year nineteen cases of crippled children were handled by the committee.

The second annual meeting of the Laurentian Sanatorium Association, which was held recently, revealed the fact that the total deficit is \$82,182. The President, Louis Colwell, pointed out that the deficiency for the year 1927, amounting to \$47,771, was caused by the maintenance of 160 beds for the indigent for whom the Association receives only \$1.34 per day, whereas the actual cost of maintenance is \$2.37. Mr. Colwell said that it was possible that at an early date the institution would be compelled to make its first appeal to the public on behalf of the tuberculous, in order that the accumulated deficiency might be wiped out, and also to provide additional and much needed accommodation. He an-

nounced that in future it would be necessary for the Association to adhere strictly to the terms of its contract with the Provincial Government. "From the point of view of medical treatment of those suffering from tuberculosis, we feel that the association has every right to be proud of its record. The report of the resident medical superintendent will clearly demonstrate the curative value of our institution which has been visited during the last year by leading specialists from the United States, Great Britain, and France and all these have been unanimous in their praise of the treatment and care given to our patients." The average daily number of patients was 223. The average number of paying patients was 54, showing that the average number of indigent patients was 169. "It is impossible for the Association to carry on with a net loss of 93 cents per hospital day for indigent patients. While we are obliged to maintain 160 beds for public patients, we actually received an average daily number of 169, which means that the maximum number of beds in use at any one time was greatly in excess of this." The Association must maintain 160 beds for indigent patients, but in no case can it afford to receive a greater maximum number than this. In that case, it may prove that the average number of public patients will be much less than received this year. Dr. J. R. Byers, told the members of the Association that the sanatorium maintained by them was the cleanest institution in which he had set foot. He commented also upon the happy home life of the patients while sojourning in the institution. Many of them were reluctant to return to the city when pronounced cured, for they had come to regard the sanatorium as their home.

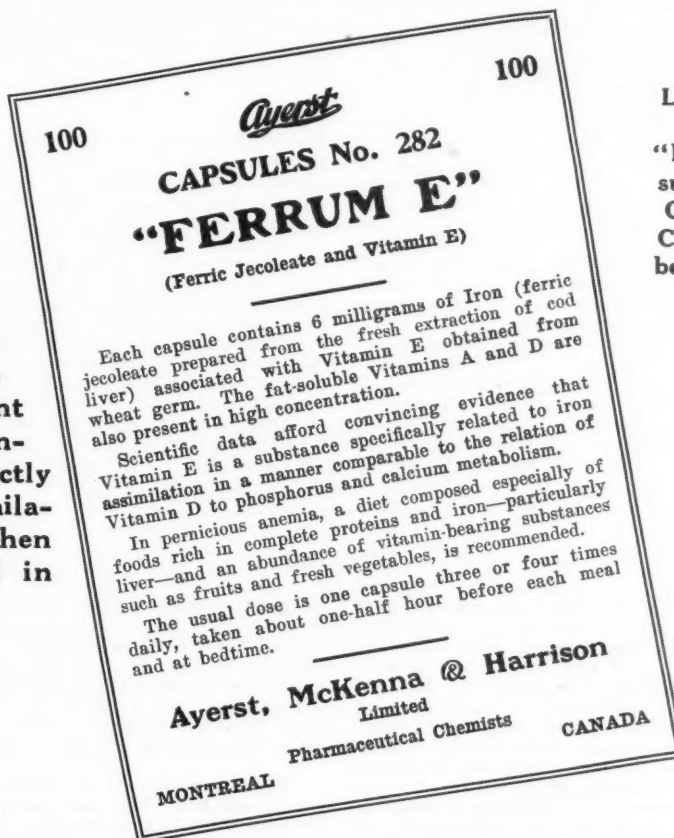
On April 1, 1925, the University of Montreal opened a health centre at 655 Demontigny Street east; the Montreal Anti-Tuberculosis and General Health League, the Metropolitan Life Insurance Company and the Provincial and Municipal Health Department contributed their financial support to the undertaking, which was placed under the medical supervision of Dr. Baudouin and the management of Nurse Edith Belle Hurley. It was called the School of Public Health Nursing of the University of Montreal, and its definite aim was to cut the rate of infant mortality in the city. Nurse Hurley, with the co-operation of four visiting graduate nurses, assisted by 10 nursing students, has achieved splendid results. At first the school's effort was concentrated in the health work to be done in the parish of

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Clinical tests with this product have shown excellent results and indicate a distinctly better assimilation of iron when administered in this medium.



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Ayerst Capsule No. 284—"Ferrum E" with Arsenic and Strychnine (1/80 grain)

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-

CANADA

Ste. Catherine. It was afterwards extended to take care of the needs of numerous families in the parish of the Sacred Heart. Both parishes have a heavy population and it had been known to the authorities that their infant death rate was very high. When Nurse Hurley and her colleagues took charge of the work the death rate among infants aggregated an average of 220 per 1,000 births. As a result of a concentrated effort carried out scientifically, this rate of 220 per 1,000 has been reduced in less than five years to 86 per 1,000. This is said to be the most splendid achievement ever attained on the North American continent in so short a period. As a direct consequence, and taking into account the heavy average of infant mortality in Ste. Catherine's parish, the general toll of child death in this city, which was in 1923, of 148 per 1,000, has been reduced in 1926 to 119. The infant death rate from 1916 to 1925 in Montreal was of 165.1 per 1,000. Miss Hurley's health centre is the only health organization in America doing preventive vaccination against tuberculosis. Since June 26, 1926, more than 600 infants have been inoculated with Calmette vaccine. The vaccine is administered in three inoculations; on the third, fifth, and seventh days after birth. At the inception of her work, Miss Hurley found that most of infant deaths were due to bottle-feeding, under insanitary conditions. She has steadily advocated maternal feeding, and when found impracticable or unadvisable, she has given simple and efficient directions to mothers on sanitary feeding. Thus, through more sanitary feeding, and through immunizing infants against the scourge of tuberculosis by the Calmette vaccine, Nurse Hurley, seconded by a small staff of most capable and zealous assistants, has achieved results unknown in any other great city of North America.

A drop in both birth and mortality figures for the city of Quebec was shown in the statistics just issued by the Provincial Bureau of Health. The first three months of the year, as compared with the same periods in the two preceding years, show a marked decrease in all

figures and more especially in infant mortality of under one year.

In comparison, Montreal is shown to have a birth-rate below the provincial average. The marriage-rate is above average and the death-rate is just a shade below average. The city of Quebec has fewer marriages, more births, and more deaths, in percentage.

Dr. A. Grant Fleming, who has been Acting Director of the Department of Public Health and Preventive Medicine at McGill, during the past year, becomes the Director of that department.

Dr. Georges Préfontaine, professor at the University of Montreal, left Montreal recently to pursue special studies at Roscoff, in the Finistère department, France, where the Faculty of Sciences of the University of Paris maintains a laboratory for deep-sea zoological research. Professor Gerard Gardner, of the same university, is leaving soon for Paris. He will complete his post-graduate studies in bacteriology at the "Institut Pasteur," under Professor Pettit.

GEORGE HALL

Under the auspices of the Post-Graduate Committee of the Province of Quebec Medical Association, a certain group of doctors of Montmagny organized a clinical day on May 22nd last, and invited, as well as the members of the profession of the county of Montmagny, their colleagues of the counties of Bellechasse and l'Islet. The great majority of the members of the profession answered the call, and considering the pitiable condition of the roads (it had rained for three consecutive days) the attendance was a marked success.

Immediately following the meeting, a new Medical Society was formed comprising the physicians of the three above-mentioned counties. The officers elected were: Dr. Richard, of Montmagny, President; Dr. Dion, of l'Islet, Vice-President; and Dr. Paradis, of Saint-Gervais, Secretary.

LÉON GÉRIN-LAJOLE,
Secretary.

ONTARIO

The class of "Toronto 1896" was entertained at Brantford, on June 6th, by the members of the class resident in that city—Drs. Marquis, Bier, Hicks and Nicol. An unusually good representation of the class arrived to take advantage of the hospitality arranged for by the Brantford brotherhood. A buffet lunch at the Brantford Golf Club, afternoon golf, a sight-seeing tour in Brantford, and a dinner in the evening made up a very full program. Members of the class from New York, Owen Sound, Goderich, Niagara Falls, Toronto and places nearby, constituted a gathering of seventeen at lunch, and twenty at dinner. The class reports and business details connected with the re-union were presented by Dr. W. E. Silcox, of Hamilton, to whose

energy and persistence the success of the re-unions in the past is largely due. At the dinner in the evening the details of the lives and activities of the absent and deceased members were presented, and each present was called upon to inform the class of his present behaviour and condition. The thanks of the class were expressed to the Brantford physicians, whose initiative had made the gathering such an unqualified success. N. B. GWYN

The infant death rate in Toronto in 1910 was 158.5; in 1927 was 58.8. The death rate from tuberculosis in 1910 was 130.0; in 1927 was 61.6. The death rate from typhoid fever in 1910 was 44.2; in 1927 was 1.1. The general death rate in 1910 was 15.1; in 1927 was 11.0.

MANITOBA

On May 16th their Excellencies, Lord and Lady Willingdon, and the vice-regal staff, accompanied by the Lieutenant-Governor of Manitoba, Hon. Dr. E. W. Montgomery, Minister of Health, Hon. D. L. McLeod, Municipal Commissioner, Mr. John McEachern, Chairman of the Manitoba Sanatorium Board, and other distinguished Winnipeg citizens, travelled by special train to Ninette for an inspection of the Sanatorium. Dr. D. A. Stewart, superintendent of the institution, received the visitors and conducted them through the various

buildings. At Lady Willingdon's request, the scholars in the sanatorium school were granted a half-holiday. Their Excellencies were greatly interested in the x-ray and examination rooms and also the arrangements for heliotherapy.

The annual meeting of the Winnipeg Medical Society was held in the Medical College on May 18th. Dr. Oliver S. Waugh, the retiring President, read an address on "The future of medical practice." The election of

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officers resulted as follows: President, Dr. A. T. Mathers; Vice-President, Dr. Lennox Arthur; Secretary, Dr. Wm. Creighton; Treasurer, Dr. M. R. MacCharles; Trustee, Dr. S. Campbell.

A contract for the construction of St. Anthony's Hospital and a power house, to be erected at The Pas, has been awarded to J. Albert Tremblay, of Winnipeg. The hospital will be a four-storey fireproof building and will contain room for 125 patients. The operating rooms will be complete and up to date in every detail. The completed building will cost \$250,000, and will be opened next January.

The annual meeting of the Manitoba Medical Society will be held in Winnipeg on September 10th and 11th.

Miss Cowan, daughter of the late Dr. William Cowan, a veteran Hudson's Bay Company surgeon, has presented to the Medical Library of Manitoba University some interesting old books formerly owned by her father.

Dr. C. R. Rice has been appointed Attending Surgeon to Grace Hospital, Winnipeg.

Dr. Gordon S. Fahrni of Winnipeg presided at the annual meeting of the American Association for the Study of Goitre at Denver, on June 18th, 19th and 20th.

John Stanley Hough, K.C., president of the Winnipeg General Hospital Board of Trustees since 1921, died on June 7th, at the age of 72. His passing is greatly regretted at the General Hospital, as for many years he had taken a keen personal interest in its welfare.

A large number of Manitoba doctors attended the meeting of the American Medical Association at Minneapolis.

Dr. A. W. Allum has left Winnipeg to practice in Los Angeles. For many years Dr. Allum was on the staff of Grace Hospital, and was also Lecturer in Obstetrics in the medical faculty.

ROSS MITCHELL

SASKATCHEWAN

At the regular monthly meeting of the Regina and District Medical Society, held May 9th, following a dinner at the Kitchener Hotel, Regina, Dr. W. A. Dakin of Regina gave an excellent paper on "Hydronephrosis; causative factors; diagnosis; and treatment." There was a good attendance, and the paper was much enjoyed, as shown by the discussion that followed. Dr. Dakin illustrated his paper by slides which he had prepared from cases.

At the previous meeting, the matter of care and education of defective children, and those who are deaf, dumb, or feeble-minded in any way, in Saskatchewan, had been discussed. Drs. U. Gareau, O. E. Rothwell, and Lillian Chase, were appointed a committee to report at the meeting held May 9th. They brought in the following resolution, which was passed:—

"Whereas Chapter sixty of the Revised Statutes of Saskatchewan, and part four thereof, makes provision for detention and committal of defective children, and, whereas, the general opinion of authorities is that defective children are not suitably provided for when admitted to mental hospitals, and, whereas, the practice at present existing in this province is to provide for the care of defectives in the mental hospitals;—Therefore, be it resolved, in the opinion of this branch of the Saskatchewan Medical Association, that the time has now arrived that the Government of Saskatchewan should earnestly be petitioned by the Provincial Body to make immediate provision for a suitable home, in order that the best interests of these unfortunates may be attended to and our Act more efficiently administered."

P. L. STRAITH,
Secretary.

During the last week in May and the first week of June another post-graduate tour was conducted in this province. The speakers at these meetings were Dr. M. R. MacCharles and Dr. H. D. Morse of Winnipeg.

The meeting in Regina, on June 4th, commenced in the morning when Drs. MacCharles and Morse held consultations. At 12.15 p.m. a luncheon was held in the General Hospital, followed by a clinical discussion of such cases as presented. In the evening at 6.15 p.m. a dinner at the Hotel Saskatchewan was followed by addresses by the distinguished visitors.

Dr. Morse gave an illustrated address on "The management of prostatic obstruction," and Dr. MacCharles gave another on "A few experiences with malignant disease." They were exceptionally thorough treatises on the subjects, and were much appreciated by the local doctors of Regina and the district.

Dr. MacCharles invited medical men of this district to co-operate with the Winnipeg and Manitoba men in making a real success of the visit of the British Medical Association to Winnipeg in 1930. Assurance of active support was given by men of the Regina and District Medical Society.

In Yorkton, there were eighteen doctors present at the meeting. Lectures were held in the afternoon, followed by a dinner, after which lantern lectures were given by the visiting team. This was an extremely successful meeting.

The Battleford District Medical Society had thirteen present at its meeting, which was held at the Mental Hospital, and a very hearty vote of thanks was moved to the visiting speakers for their splendid addresses.

Meetings were also held at Moose Jaw, Saskatoon, Prince Albert, Swift Current, Weyburn; all were very successful and well attended.

The North Eastern District Medical Society held their annual meeting on May 28th, when the following officers were elected: President, Dr. D. R. Livingstone, Melville; First Vice, Dr. W. E. Somers, Foam Lake; Second Vice, Dr. D. Baldwin, Benito; Executive, Dr. S. M. Rose, Yorkton, and Dr. Findlay, Lemberg; Secretary-Treasurer, Dr. A. F. Laird, Yorkton; Representative to the Association, Dr. A. F. Laird, Yorkton.

BRITISH COLUMBIA

At the annual meeting of the Vancouver Medical Association, held on April 24th, Dr. Walter S. Turnbull was elected President for 1928-29. Dr. Turnbull has

been an active member of the Association in minor offices for the past few years. Dr. Theo. H. Lennie was elected Vice-President; Dr. Lennie is the popular Secre-

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tary of the British Columbia Medical Association. Dr. G. F. Strong was again elected Secretary, and Dr. J. W. Arbuckle will act as Treasurer.

The question of closer co-operation, or amalgamation, between the local and provincial Associations is a live topic in Vancouver and the province generally just now, and will be thoroughly discussed at the annual meeting of the British Columbia Medical Association next week. The Vancouver Association has already voted in favour of the proposed closer union.

Dr. F. Epplen, of Seattle, addressed a meeting of the Victoria Medical Society on May 8th, giving an illustrated talk on "The diagnosis of kidney conditions." Dr. M. W. Thomas, the President, was in the chair.

The Victoria Medical Society held a luncheon on May 16th, at the Empress Hotel, when Dr. Hermann M. Robertson addressed the members, dealing in a most interesting manner with "William Harvey," this being the tercentenary of the revelation by the immortal Harvey of the circulation of the blood. Dr. Robertson was warmly thanked by the society, on motion of Dr. H. E. Ridewood, who spoke briefly of the value and interest in the series of lectures on Masters of Medicine inaugurated last month, when Dr. Thomas McPherson delivered an address on "John Hunter," whose bicentenary was thus celebrated.

Dr. Hermann Robertson showed a copy of William Harvey's work in Latin and English, "*Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus*," first published in 1628.

The annual meeting of the No. 6 District Medical Society, Vancouver Island, was held on May 7th, at Nanaimo, when an appreciative audience listened to lectures given by Dr. G. F. Strong, of Vancouver, on "Blood pressure," and Dr. Lyon H. Appleby on "Intestinal obstruction" and "Strangulated hernia." Dr. Wallace Wilson, President-elect of the British Columbia Medical Association, also spoke on the activities of the provincial Association. Officers for the past year were re-elected: Dr. A. D. Morgan, Alberni, President; Dr. W. E. J. Ekins, Nanaimo, Vice-President; and Dr. O. Ingham, Nanaimo, Secretary-Treasurer.

The annual meeting of the British Columbia Medical Association was held at the Empress Hotel, Victoria, on June 11th and 12th. A full report will be published in the next issue of the *Journal*.

The Fraser Valley Medical Society reports that it has recommended to the Royal Columbian Hospital that it secure a basal metabolism machine. The annual meeting of the Society will be held in June.

Much post-graduate work is in store this year for the medical profession in this province. June 5th to 8th, Summer School at Vancouver; June 11th and 12th, at

Victoria; June 13th and 14th, at Kamloops; June 18th, at Fernie.

The elaborate program of the Vancouver Summer School has already been published. At Victoria, Kamloops, and Fernie, clinical addresses will be given by Dr. F. A. C. Seriminger, V.C., Dr. F. H. MacKay, both of Montreal, and Dr. Andrew Hunter, of Toronto. The meeting in Victoria will be held in conjunction with the annual meeting of the British Columbia Medical Association. A very complete program, scientific, business, and social, has been arranged. The entertainment part has been given special attention, and those who had the privilege of attending the Canadian Medical Association Convention in Victoria two years ago will know what this means. In July, Drs. H. B. Cushing, of Montreal, and Dr. A. W. Canfield, of Toronto, paediatricians, will visit the following places, giving lectures under the auspices of the Canadian Medical and British Columbia Medical Associations: July 3rd, Victoria; July 4th, Nanaimo; July 5th, New Westminster; July 6th, Chilliwack; July 7th, Vancouver.

In August and September Dr. A. T. Bazin and Dr. A. H. Gordon, of Montreal, and Dr. Gordon Bates, of Toronto will tour the province, giving lectures at the following places: Cranbrook, Grand Forks, Kelowna, Vancouver, Victoria, Nanaimo, Chilliwack, Prince Rupert and Prince George.

The Summer School of the Vancouver Medical Association will be held the first week in June. Already the sale of tickets is highly satisfactory, and a good attendance is assured. This will be the eighth annual summer school to be promoted by the Vancouver Association.

The new buildings which are being erected for the Vancouver General Hospital are making good progress and it is anticipated they will be ready for occupation about the New Year. The new buildings are a private ward pavilion and a maternity wing, which, together, will provide 240 beds.

The graduating exercises of the training schools of the Vancouver General and St. Paul's Hospitals were held during the past month. Seventy nurses graduated from the Vancouver General and twenty-eight from St. Paul's Hospital.

Taking revenge for their defeat in Seattle on April 26th last, the Vancouver and Victoria medicos met and turned back the Seattle invaders on the links of the Vancouver Golf and Country Club on May 10th, to the tune of 94½ to 67½ points.

Dr. G. Morse of Port Haney has left for two or three months' post-graduate work in the east. His practice during his absence is being cared for by Dr. A. K. Connolly.

Our deepest sympathy is extended to Dr. A. S. Underhill of Kelowna, B.C., on the death of his mother, Mrs. M. J. Underhill, of Vancouver, on May 13th.

J. EWART CAMPBELL

UNITED STATES

It is announced that Dr. F. D'Herelle, one of the world's leading bacteriologists, a Canadian, but for years a resident of Paris, will become professor of bacteriology at the Yale medical school. He is best known for his development on the subject of bacteriophagy and has made important contributions in many fields of pure and applied bacteriology.

Still retaining his Canadian citizenship, he went to

France to acquire his education. At the close of the war he went to Indo-China and made a study of the relationship of bacteriophage to hemorrhagic septicemia, including plague in man and in animals.

Upon his return from Indo-China, he spent some time at the Pasteur Institute and then went to the University of Leyden. At this university he received the degree of "M.D., *honoris causa*."

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CANADA

Book Reviews

Gynecology. Howard A. Kelly, A.B., M.D., LL.D., and others. 1043 pages, 767 illustrations. D. Appleton & Co., New York, 1928.

This is a remarkably good book. That it should be so is not surprising, when one remembers the extent of Dr. Kelly's personal contributions to operative gynecology and the contributions of his associates to gynecological pathology. From a tremendous storehouse of drawings and pathological material a master has selected a series of original plates and drawings suited to depict all that is known of the anatomy, physiology and pathology of the female genitalia; then around these illustrations there has been woven a legend, primarily by Dr. Kelly himself, but also by numerous others, such as: George Ward, Gellhorn, Burnham and Rubin, whose names carry authority in their special departments. Others, less well known, have been chosen by Dr. Kelly to write upon those subjects with which he personally knew them to be familiar.

"Anatomy" (Kelly), illustrated by the already well known drawings of Brödel, is followed by "Histology" (Glenn Craig) with numerous new illustrations, particularly of changes in the endometrium. A full description of gynecological examinations and diagnostic aids, carries definite statements on the relative values of the different procedures. Special chapters deal with "Amenorrhea," "Dysmenorrhea," "Endocrinology and Organotherapy," "Congenital Malformation and Developmental Defects"; "Sterility" (Wharton); "Periuterine Tubal Insufflation in Sterility" (Rubin); others treat of "Leucorrhoea," "Pruritus," and "Dyspareunia." Then follows, for the surgeon, perhaps the most interesting portion of the book, an extensive survey of operative procedures with sound advice on technique, pre-operative and post-operative care. This is naturally, for the most part, by Dr. Kelly, but the section dealing with pelvic floor plasties by George Gray Ward is so well written and well illustrated that one realizes, here particularly, the good judgment of the author in the choice of collaborators. The pathological section is interesting and complete, the chapter on endometriomata, by Lewis, being particularly timely. Protein therapy is dealt with by Gellhorn, radium by Burnham, and x-ray by Fricke, while Peterson has contributed a chapter on pneumo-peritoneal roentgenology.

The above is a bare statement of some of the features of this remarkable book, which from its preface to its very end is full of words of wisdom. Indeed, after reading the preface, it is doubtful whether one would be willing to put it away; for, there, in a few words, the writer has compressed the history of gynecology in America; has given honour to those who were his predecessors and contemporaries; and characteristically has pointed out the value of the contributions of younger men, so many of whom worked with his inspiration. A great clinician, a keen observer, and possibly the most expert operator in the field of gynecology, has produced a book, which for that subject will take a place comparable to "Osler" in the field of medicine. H. M. LITTLE

Pharmacotherapeutics. Materia Medica and Drug Action. Solomon Solis-Cohen and Thomas Stotestbury Githens, Dr. Appleton & Co., 1928.

As is implied by the title, this book covers a wide field, and not only is the undertaking ambitious but it

is carried out on an elaborate scale. The interesting historical note on the origin of "mithridatism" is an example of the detail. It has been attempted to produce something more than the ordinary pharmacological text-book, by considering drugs from the point of view of the practitioner of medicine who finds that where the pharmacologist is able to be definite and exact regarding the action of drugs, he himself often experiences indefiniteness and not seldom contradiction. He finds, for instance, that there are drugs whose action on bacteria *in vitro*, or in animals, in no sense corresponds with their clinical value, witness the deadly effect of quinine on the pneumococcus, but its entire lack of specific action in pneumonia in man.

This is but one instance of how much clinical experience and laboratory experiments may diverge from each other. If they are to be reconciled a good step has been taken in the cause by bringing them together under one cover, according to the plan of this volume. In the main, drugs have been classified on a clinical basis, but due attention has always been paid to their chemical and pharmacological aspects. As regards the latter, it is a question whether there is not rather too much detail for the needs of the practitioner, but thoroughness is a good quality in which to be extreme.

The introductory chapters afford some interesting reading, although the style is not particularly easy. After an outline of the field to be covered, and some general definitions, a chapter is devoted to Disease and Recovery, with much laborious analysis. Chapter III is devoted to Indications and Contraindications, with many sound and useful hints. After this, the main theme of the book is begun in the chapter on "Drug Influence," with an exhaustive discussion of the many factors involved; physico-chemical, such as electrolytic dissociation; colloids and enzymes; hormones; the various forms of intra- and extracellular influence; modification by function; general and selective actions; personal factors, such as idiosyncrasy; pathological factors; drug addiction; and sensitization.

A large amount of information with regard to the source and preparation of drugs is given, and a section is devoted to their therapeutic use, in which methods of administration are taken up in detail. There is a well-balanced criticism of homeopathic doctrines under Schools of Medicine.

The classification of remedial agents has been made in accordance with (1) their uses in medicine: (a) to combat the excitants of disease; (b) to alter tissue; (c) to modify function; (2) their dominant influences—which necessarily determine their chief use; (d) their predominant chemical components or proximate principles "insofar as these determine influence and therefore use." As a minor point of criticism, it may be pointed out that the only mention given lipiodol is as a remedy for bronchomoniliasis, whilst bismuth salts are referred to as those to be used for radiographic examination of the bronchial tree.

The work is well up-to-date, and judicious selections have been made of these therapeutic agents which are still on probation. Under Metabolic Adjuvants, for example, only the well-known endocrine extracts are given place.

In general, the book is a thoroughly sound and comprehensive exposition of modern therapeutic methods, and will be useful to student and practitioner alike. H. E. MACDERMOT

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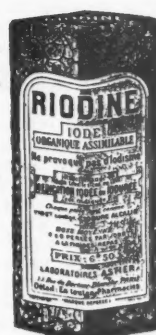
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Clinical Examination of the Nervous System. G. H. Monrad-Krohn, M.D., F.R.C.P. Fourth edition. 209 pages, 55 illustrations. Price 7/6. H. K. Lewis Co., 28 Gower Place, London W.C.1, England, 1928.

One may know at once that a manual of examination methods that reaches its fourth edition in seven years has not only found a place for itself but is being kept up to date. The first of these beliefs finds confirmation in the widespread use of the book by general practitioners, neurologists and teachers; the second, in the recent date of references in the book.

The object of the author has been to present a system of examination that, while not too long, will yet bring out all the significant details of functional disturbance that the case presents. One can only say that the object has been satisfactorily attained. The marks of long experience, both as clinician and teacher, are in evidence everywhere. A point that one especially notes with pleasure is a definite attempt to bring together the methods of neurology and psychiatry. The separation of these really inseparable subjects has been a detriment to both, and has been suffered much too long. Another point that will have an appeal is that the book is not a translation but is written in English by Professor Monrad-Krohn himself. The disabilities of most translations are absent and the style is clear and emphatic. Only occasionally does one note expressions and constructions that are exotic.

The book is primarily intended for students, and much emphasis is placed on the inculcation, not only of an orderly and careful method of examination, but also of an orderly method of diagnosis based upon anatomical and physiological knowledge. The futility and uncertainty of trying to diagnose nervous disease by comparison of observations with text-book lists of the characteristics of various clinical entities is emphasized, and will rouse an affirmative echo in the mind of those who practice and teach neurology.

There is no need to review in detail the author's presentation. One need only say that all the usual methods receive due notice, many of the less frequently used are mentioned, and throughout point and savour are added by interpolations from the author's own experience or from recent contributions to the literature. The illustrations are all good. Some of the diagrams are those most used in text-books on neurology, but there are others of value that are new. The many half-tone reproductions are remarkably clear and relevant.

The book covers different ground, but, in the present reviewer's opinion, is in the same class with Bings' *Compendium of Regional Diagnosis*, and that is saying a great deal.

A. T. MATHERS

Schizophrenia (Dementia Præcox). Edited by Charles L. Dana, Thomas K. Davis, Smith Ely Jelliffe, Henry Alsop Riley, Frederick Tilney, and Walter Timme. 491 pages and 61 illustrations. Price \$7.50. Paul B. Hoeber, Inc., New York, 1928.

This volume is number five of the series published by the Association for Research in Nervous and Mental Disease. It consists of the papers read at the meeting of the Association in New York in December, 1925. Most of the recent advances in this extremely interesting subject are discussed by thirty-one contributors, including the leading American authorities in psychiatry.

The twenty-six chapters are classified according to subject matter into nine sections as follows: Historical Survey and Delimitations, Statistics, Heredity and Constitution including Personality, Special Etiological Considerations, Investigative Aspects, Language and Art Productions, Pathology, Prognosis, and Treatment. The book is thus comprehensive in scope and treats of practically all phases of dementia præcox from its philosophical implications to its biochemical and endocrinological aspects.

This work shows that the knowledge of dementia præcox has increased considerably since Kraepelin first described it as a specific disease entity in 1898. There has also been a marked change in point of view since the Kraepelinian emphasis on course and outcome, with its rather pessimistic outlook. The present tendency is towards a greater emphasis on psychological factors, both in symptomatology and in etiology. There is thus frequent use of such terms as maladjustment, disintegration, and to use Bleuler's expression, schizophrenia. In this connection, the discussion of the physical and mental personality types in schizophrenia and other psychoses will be found particularly interesting because of the light it throws on normal personality. Other contributions of special interest are those on language and art productions, autonomic and gastro-intestinal functions, and the relation of schizophrenia to other conditions such as alcoholism, acute infectious diseases, epidemic encephalitis, and the psychoneuroses.

A valuable feature of the book is the reproduction of the discussion which followed the presentation of each paper. Many otherwise obscure points and divergencies of view are thus brought to light. The book contains photographs of Kraepelin and Bleuler, the two psychiatrists who have contributed most to the understanding of dementia præcox. It also contains a number of very good bibliographies following special articles. It has an index of subjects and authors, and an appendix consisting of a list of members of the Association for Research in Nervous and Mental Disease. This book will be found both interesting and instructive to all physicians who wish to keep abreast of the times in their knowledge of schizophrenia and allied conditions.

J. W. BRIDGES

Principles and Practice of Obstetrics. Joseph B. DeLee, A.M., M.D., Professor of Obstetrics at the Northwestern University Medical School. 5th edition. 1140 pages, 1128 illustrations. Price \$12.00. London and Philadelphia, W. B. Saunders Co.; Toronto, McInsh & Co., 1928.

The appearance of a new edition of DeLee's *Obstetrics* is an event of importance in obstetrical circles. Dr. DeLee is a stimulating writer and teacher and his book bears the impress of his personality. Whether one agrees unreservedly or not with all his conclusions, one has to acknowledge the great range of his experience, his ability as a teacher, his wide acquaintance with the literature of his subject and his desire to enhance the dignity of the art of obstetrics.

In this edition considerable space is devoted to prenatal care. Dr. DeLee remarks that there is no field in preventive medicine that offers the prospect of such glittering returns in saving human life and misery. He insists on the importance of pelvimetry, especially internal pelvimetry.

The chapters on the treatment of hyperemesis, eclampsia abruptio placenta, placenta prævia, rupture of the uterus, postpartum hæmorrhage, breech presentation and forceps operations have been almost completely rewritten. The modified Simpson forceps is preferred to axis-traction forceps.

The low Cæsarean section, or laparotrachelotomy, an operation which offers many advantages, especially in possibly infected cases, over the classical section is well described and illustrated. The Gottschalk-Portes two-stage Cæsarean section for preserving the uterus in frankly infected cases is described briefly.

The illustrations of injuries of the birth canal and the technique of perineorrhaphy and repair of the cervix bring out the surgical anatomy of the parts and are really helpful.

Although the book contains over eleven hundred pages it can be handled conveniently. The publishers,

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W. B. Saunders Company, are to be congratulated on the excellence of the press work and the illustrations. This work can be heartily commended to the advanced student and practitioner.

ROSS MITCHELL

Diagnosis of Disease. Hobart Amory Hare, B.Sc., M.D., LL.D. Ninth edition. 528 pages, illustrated. Price \$5.50. Lea & Febiger, Philadelphia, 1928.

It is hardly possible to dwell too constantly on the importance of noting symptoms rather than of depending on artificial aids to diagnosis. In Maitland Ramsay's words "There is too little study of what used to be called the face and mind of disease."

This idea has constantly guided Dr. Hare in his excellent work, now in its ninth edition, and deservedly so. He has managed to compress a large amount of material into a small compass. If any one chapter were to be singled out for praise it might be that on the "Thorax and its viscera." In this he has discussed methods of examination and symptoms with directness and simplicity, and has employed illustrations that are unusually satisfactory.

H. E. MACDERMOT

The Extra-Ocular Muscles. A Clinical Study of Normal and Abnormal Ocular Motility. Luther C. Peter, A.M., M.D., Sc.D. Professor of Diseases of the Eye in the Graduate School of the University of Pennsylvania. 294 pages, illustrated with 98 engravings and 5 coloured plates. Price \$4.00. Lea & Febiger, Philadelphia, 1927.

This work is based on lectures given by the author in the Graduate School of Medicine of the University of Pennsylvania. It is a sound, practical, and interesting clinical presentation of the subject of normal and abnormal ocular motility, and as such can be cordially recommended.

Our criticisms are that the text is marked by a looseness of expression which, though it does not seriously obscure the writer's meaning, does detract from the literary value of the book; and that, though the paper and printing are good, and the illustrations numerous and well chosen, the binding leaves something to be desired.

Practical Dietetics in Health and Disease. Sanford Blum, A.B., M.S., M.D. Third edition. 380 pages. Price \$4.00. F. A. Davis Co., Philadelphia, 1928.

The prescribing of dietaries makes frequent demand on the practitioner's time and thought. A book such as this therefore has a considerable place to fill. One of its first characteristics should be convenience of arrangement, and this has been striven for even at the expense of a good deal of repetition. The plan of taking certain cases briefly described and laying out diets for them is useful.

The directions regarding infant feeding are clear and easy to follow in the home. There is a rather noticeable lack of reference to the use of cod liver oil in the early months, and fruit juices are not introduced into the scheme of feeding until the sixth month.

The book has reached its third edition within five years and it is obvious that care has been taken to keep it well up to date.

H. E. MACDERMOT

The Art of Anaesthesia. Paluel J. Flagg, M.D., Visiting Bronchoscopic Anaesthetist, Manhattan Eye and Ear Hospital. Fourth edition revised. 384 pages, 135 illustrations. Price \$5.50. J. B. Lippincott Co., 201 Unity Bldg., Montreal, 1928.

Dr. Flagg's book, the fourth edition of which has recently been issued, is nothing if not practical. In it are described not only those methods which are in daily use in large modern clinics, but also those that are practicable in private houses and in small hospitals where money to spend on equipment is strictly limited.

In the author's opinion ether retains its place as the most suitable anaesthetic for routine use. He has not much to say in favour of oil-ether rectal anaesthesia, having found this method unreliable, and the preparations for it often distressing to the patient. An accurate estimation of its dangers, as he points out, cannot be made because the deaths from it have been allowed to go unreported.

The subjects of local and spinal anaesthesia might, with advantage, have been dealt with a little more fully. The chapters on "Carbon Dioxide and Rebreathing," and upon "Emergency Anaesthesia" are excellent.

Not all experienced anaesthetists will agree with the author's statements that there is no advantage in heating ether vapour, and that the preliminary dose of morphine and atropine should be omitted when the open method is to be used.

Those who are familiar with the literature published on the treatment of sudden arrest of the heart during anaesthesia will be surprised to find that nothing is said of the direct injection of adrenalin into the heart.

The reader unfamiliar with the American spelling and use of words will read this book with a feeling almost of bewilderment. For instance, "doze" and "yoke" are spelt respectively "dose" and "yolk." When we find "technique" spelt both "technique" and "technic" we find ourselves wondering whether "physique" and "physic" in the author's mind have the same meaning. It is a relief to find that Dr. Flagg allows the word "anaesthesia" to retain its diphthong. When we read of a patient "who died spontaneously a few minutes before the anaesthetic was administered" we are forced to the conclusion that the anaesthetist was either unobservant or absent-minded.

The illustrations are many and good, and the book full of useful hints to practitioners and students.

W. B. HOWELL

BOOKS RECEIVED

Clinical Surgery. An Introduction for Junior Students.

J. W. Dowden, M.B., F.R.C.S.E. 68 pages, price 2/- net. Oliver & Boyd, Edinburgh, 1928.

A short and pleasantly written introduction to surgery, with most attention paid to the method of examination.

Health Record for Women. J. Theron Hunter, M.D.

Published by Williams & Wilkins, Baltimore, 1928.

A diary in blank for recording physical infirmities.

